



ADMIRALTY

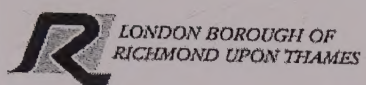
The Nautical Almanac

Her Majesty's Nautical Almanac Office



UK Hydrographic
Office

NP314-23
2023



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THE NAUTICAL ALMANAC 2023

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A2 ALTITUDE CORRECTION TABLES 10°-90°—SUN, STARS, PLANETS

OCT.—MAR. SUN						APR.—SEPT.						STARS AND PLANETS						DIP					
App. Lower Upper			App. Lower Upper			App Corr ⁿ		App. Additional		Ht. of Corr ⁿ		Ht. of		Ht. of Corr ⁿ									
Alt.	Limb	Limb	Alt.	Limb	Limb	Alt.		Alt.	Corr ⁿ	Eye		Eye		Eye									
2023																							
VENUS																							
Jan. 1—May 1																							
Dec. 2—Dec. 31																							
0 /																							
60 +0.1																							
May 2—June 19																							
Oct. 10—Dec. 1																							
0 /																							
41 +0.2																							
76 +0.1																							
June 20—July 12																							
Sept. 16—Oct. 9																							
0 /																							
34 +0.3																							
60 +0.2																							
80 +0.1																							
July 13—July 28																							
Aug. 31—Sept. 15																							
0 /																							
29 +0.4																							
51 +0.3																							
68 +0.2																							
83 +0.1																							
July 29—Aug. 30																							
0 /																							
26 +0.5																							
46 +0.4																							
60 +0.3																							
73 +0.2																							
84 +0.1																							
MARS																							
Jan. 1—Feb. 11																							
0 /																							
41 +0.2																							
76 +0.1																							
Feb. 12—Dec. 31																							
0 /																							
60 +0.1																							
m																							
2.4 /																							
ft.																							
2.6 -2.8 8.0																							
2.8 -2.9 8.6																							
3.0 -3.0 9.2																							
3.2 -3.1 9.8																							
3.4 -3.2 10.5																							
3.6 -3.3 11.2																							
3.8 -3.4 11.9																							
4.0 -3.5 12.6																							
4.0 -3.6 13.3																							
4.3 -3.7 14.1																							
4.5 -3.8 14.9																							
4.7 -3.9 15.7																							
5.0 -4.0 16.5																							
5.2 -4.1 17.4																							
5.5 -4.2 18.3																							
5.8 -4.3 19.1																							
6.1 -4.4 20.1																							
6.3 -4.5 21.0																							
6.6 -4.6 22.0																							
6.9 -4.7 22.9																							
7.2 -4.8 23.9																							
7.5 -4.9 24.9																							
7.9 -5.0 26.0																							
8.2 -5.1 27.1																							
8.5 -5.2 28.1																							
8.8 -5.3 29.2																							
9.2 -5.4 30.4																							
9.5 -5.5 31.5																							
9.9 -5.6 32.7																							
10.3 -5.7 33.9																							
10.6 -5.8 35.1																							
11.0 -5.9 36.3																							
11.4 -6.0 37.6																							
11.8 -6.1 38.9																							
12.2 -6.2 40.1																							
12.6 -6.3 41.5																							
13.0 -6.4 42.8																							
13.4 -6.5 44.2																							
13.8 -6.6 45.5																							
14.2 -6.7 46.9																							
14.7 -6.8 48.4																							
15.1 -6.9 49.8																							
15.5 -7.0 51.3																							
16.0 -7.1 52.8																							
16.5 -7.2 54.3																							
16.9 -7.3 55.8																							
17.4 -7.4 57.4																							
17.9 -7.5 58.9																							
18.4 -7.6 60.5																							
18.8 -7.7 62.1																							
19.3 -7.8 63.8																							
19.8 -7.9 65.4																							
20.4 -8.0 67.1																							
20.9 -8.1 68.8																							
21.4 -8.2 70.5																							

App. Alt. = Apparent altitude = Sextant altitude corrected for index error and dip.

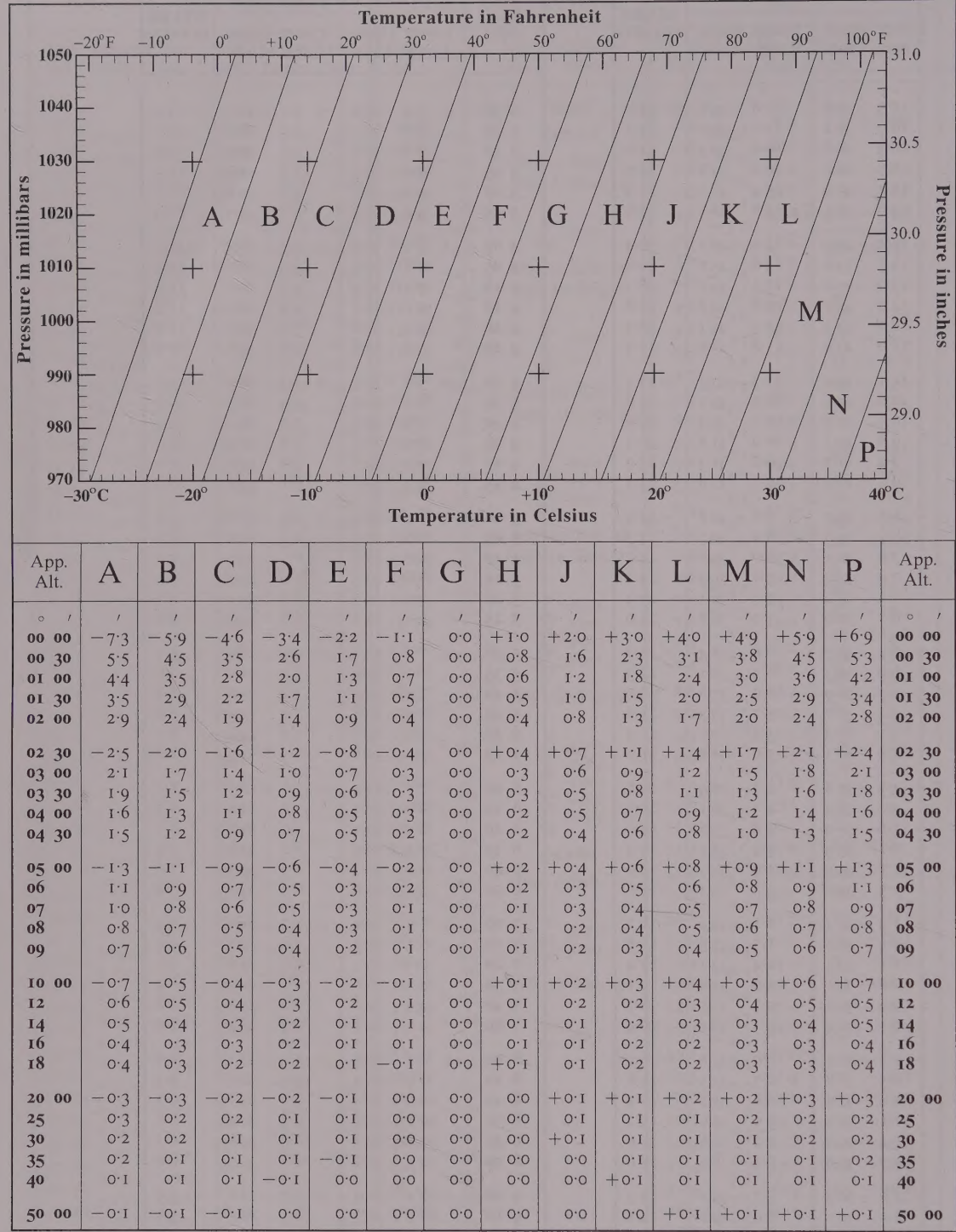
ALTITUDE CORRECTION TABLES 0°-10°—SUN, STARS, PLANETS A₃

App. Alt.	OCT.—MAR. SUN APR.—SEPT.				STARS PLANETS
	Lower Limb	Upper Limb	Lower Limb	Upper Limb	
0 00	-17.5	-49.8	-17.8	-49.6	-33.8
0 03	16.9	49.2	17.2	49.0	33.2
0 06	16.3	48.6	16.6	48.4	32.6
0 09	15.7	48.0	16.0	47.8	32.0
0 12	15.2	47.5	15.4	47.2	31.5
0 15	14.6	46.9	14.8	46.6	30.9
0 18	-14.1	-46.4	-14.3	-46.1	-30.4
0 21	13.5	45.8	13.8	45.6	29.8
0 24	13.0	45.3	13.3	45.1	29.3
0 27	12.5	44.8	12.8	44.6	28.8
0 30	12.0	44.3	12.3	44.1	28.3
0 33	11.6	43.9	11.8	43.6	27.9
0 36	-11.1	-43.4	-11.3	-43.1	-27.4
0 39	10.6	42.9	10.9	42.7	26.9
0 42	10.2	42.5	10.5	42.3	26.5
0 45	9.8	42.1	10.0	41.8	26.1
0 48	9.4	41.7	9.6	41.4	25.7
0 51	9.0	41.3	9.2	41.0	25.3
0 54	-8.6	-40.9	-8.8	-40.6	-24.9
0 57	8.2	40.5	8.4	40.2	24.5
1 00	7.8	40.1	8.0	39.8	24.1
1 03	7.4	39.7	7.7	39.5	23.7
1 06	7.1	39.4	7.3	39.1	23.4
1 09	6.7	39.0	7.0	38.8	23.0
1 12	-6.4	-38.7	-6.6	-38.4	-22.7
1 15	6.0	38.3	6.3	38.1	22.3
1 18	5.7	38.0	6.0	37.8	22.0
1 21	5.4	37.7	5.7	37.5	21.7
1 24	5.1	37.4	5.3	37.1	21.4
1 27	4.8	37.1	5.0	36.8	21.1
1 30	-4.5	-36.8	-4.7	-36.5	-20.8
1 35	4.0	36.3	4.3	36.1	20.3
1 40	3.6	35.9	3.8	35.6	19.9
1 45	3.1	35.4	3.4	35.2	19.4
1 50	2.7	35.0	2.9	34.7	19.0
1 55	2.3	34.6	2.5	34.3	18.6
2 00	-1.9	-34.2	-2.1	-33.9	-18.2
2 05	1.5	33.8	1.7	33.5	17.8
2 10	1.1	33.4	1.4	33.2	17.4
2 15	0.8	33.1	1.0	32.8	17.1
2 20	0.4	32.7	0.7	32.5	16.7
2 25	-0.1	32.4	-0.3	32.1	16.4
2 30	+0.2	-32.1	0.0	-31.8	-16.1
2 35	0.5	31.8	+0.3	31.5	15.8
2 40	0.8	31.5	0.6	31.2	15.4
2 45	1.1	31.2	0.9	30.9	15.2
2 50	1.4	30.9	1.2	30.6	14.9
2 55	1.7	30.6	1.4	30.4	14.6
3 00	+2.0	-30.3	+1.7	-30.1	-14.3
3 05	2.2	30.1	2.0	29.8	14.1
3 10	2.5	29.8	2.2	29.6	13.8
3 15	2.7	29.6	2.5	29.3	13.6
3 20	2.9	29.4	2.7	29.1	13.4
3 25	3.2	29.1	2.9	28.9	13.1
3 30	+3.4	-28.9	+3.1	-28.7	-12.9
3 30	+3.4	-28.9	+3.1	-28.7	-12.9
3 35	3.6	28.7	3.3	28.5	12.7
3 40	3.8	28.5	3.6	28.2	12.5
3 45	4.0	28.3	3.8	28.0	12.3
3 50	4.2	28.1	4.0	27.8	12.1
3 55	4.4	27.9	4.1	27.7	11.9
4 00	+4.6	-27.7	+4.3	-27.5	-11.7
4 05	4.8	27.5	4.5	27.3	11.5
4 10	4.9	27.4	4.7	27.1	11.4
4 15	5.1	27.2	4.9	26.9	11.2
4 20	5.3	27.0	5.0	26.8	11.0
4 25	5.4	26.9	5.2	26.6	10.9
4 30	+5.6	-26.7	+5.3	-26.5	-10.7
4 35	5.7	26.6	5.5	26.3	10.6
4 40	5.9	26.4	5.6	26.2	10.4
4 45	6.0	26.3	5.8	26.0	10.3
4 50	6.2	26.1	5.9	25.9	10.1
4 55	6.3	26.0	6.1	25.7	10.0
5 00	+6.4	-25.9	+6.2	-25.6	-9.8
5 05	6.6	25.7	6.3	25.5	9.7
5 10	6.7	25.6	6.5	25.3	9.6
5 15	6.8	25.5	6.6	25.2	9.5
5 20	7.0	25.3	6.7	25.1	9.3
5 25	7.1	25.2	6.8	25.0	9.2
5 30	+7.2	-25.1	+6.9	-24.9	-9.1
5 35	7.3	25.0	7.1	24.7	9.0
5 40	7.4	24.9	7.2	24.6	8.9
5 45	7.5	24.8	7.3	24.5	8.8
5 50	7.6	24.7	7.4	24.4	8.7
5 55	7.7	24.6	7.5	24.3	8.6
6 00	+7.8	-24.5	+7.6	-24.2	-8.5
6 10	8.0	24.3	7.8	24.0	8.3
6 20	8.2	24.1	8.0	23.8	8.1
6 30	8.4	23.9	8.2	23.6	7.9
6 40	8.6	23.7	8.3	23.5	7.7
6 50	8.7	23.6	8.5	23.3	7.6
7 00	+8.9	-23.4	+8.7	-23.1	-7.4
7 10	9.1	23.2	8.8	23.0	7.2
7 20	9.2	23.1	9.0	22.8	7.1
7 30	9.3	23.0	9.1	22.7	6.9
7 40	9.5	22.8	9.2	22.6	6.8
7 50	9.6	22.7	9.4	22.4	6.7
8 00	+9.7	-22.6	+9.5	-22.3	-6.6
8 10	9.9	22.4	9.6	22.2	6.4
8 20	10.0	22.3	9.7	22.1	6.3
8 30	10.1	22.2	9.9	21.9	6.2
8 40	10.2	22.1	10.0	21.8	6.1
8 50	10.3	22.0	10.1	21.7	6.0
9 00	+10.4	-21.9	+10.2	-21.6	-5.9
9 10	10.5	21.8	10.3	21.5	5.8
9 20	10.6	21.7	10.4	21.4	5.7
9 30	10.7	21.6	10.5	21.3	5.6
9 40	10.8	21.5	10.6	21.2	5.5
9 50	10.9	21.4	10.6	21.2	5.4
10 00	+11.0	-21.3	+10.7	-21.1	-5.3

Additional corrections for temperature and pressure are given on the following page.

For bubble sextant observations ignore dip and use the star corrections for Sun, planets and stars.

A4 ALTITUDE CORRECTION TABLES—ADDITIONAL CORRECTIONS
ADDITIONAL REFRACTION CORRECTIONS FOR NON-STANDARD CONDITIONS



The graph is entered with arguments temperature and pressure to find a zone letter; using as arguments this zone letter and apparent altitude (sextant altitude corrected for index error and dip), a correction is taken from the table. This correction is to be applied to the sextant altitude in addition to the corrections for standard conditions (for the Sun, stars and planets from page A2-A3 and for the Moon from pages xxxiv and xxxv).

THE NAUTICAL ALMANAC

FOR THE YEAR

2023

TAUNTON

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WASHINGTON

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under the authority of the
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THE UK HYDROGRAPHIC OFFICE

2022

UNITED KINGDOM

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NOTE

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PREFACE

The British and American editions of *The Nautical Almanac*, which are identical in content, are produced jointly by H. M. Nautical Almanac Office, part of the United Kingdom Hydrographic Office, under the supervision of S. A. Bell, A. J. Wilmot and M. Moffett, and by the Nautical Almanac Office, United States Naval Observatory, under the supervision of S. G. Stewart and M. T. Stollberg, to the general requirements of the Royal Navy and of the United States Navy. The Almanac is printed separately in the United Kingdom and in the United States of America.

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This volume includes a section on Polar Phenomena. This gives graphs of the semiduration of sunlight, twilight and moonlight at high latitudes from which the times of rising and setting of the Sun and Moon and the times of civil twilight can be calculated. An explanation and examples are also given.

RADM PETER SPARKES

Chief Executive

UK Hydrographic Office

Admiralty Way, Taunton

Somerset, TA1 2DN

United Kingdom

HARTWELL F. COKE, V

Captain, U.S. Navy

Superintendent, U.S. Naval Observatory

3450 Massachusetts Avenue NW

Washington, D.C. 20392-5420

U.S.A.

November 2021

RELIGIOUS CALENDARS

Epiphany	Jan. 6	Low Sunday	Apr. 16
Septuagesima Sunday	Feb. 5	Rogation Sunday	May 14
Quinquagesima Sunday	Feb. 19	Ascension Day—Holy Thursday	May 18
Ash Wednesday	Feb. 22	Whit Sunday—Pentecost	May 28
Quadragesima Sunday	Feb. 26	Trinity Sunday	June 4
Palm Sunday	Apr. 2	Corpus Christi	June 8
Good Friday	Apr. 7	First Sunday in Advent	Dec. 3
Easter Day	Apr. 9	Christmas Day (Monday)	Dec. 25
First Day of Passover (Pesach)	Apr. 6	Day of Atonement (Yom Kippur)	Sept. 25
Feast of Weeks (Shavuot)	May 26	First day of Tabernacles (Succoth)	Sept. 30
Jewish New Year 5784 (Rosh Hashanah)	Sept. 16		

Ramadân, First day of (tabular) Mar. 23 Islamic New Year (1445) July 19

The Jewish and Islamic dates above are tabular dates, which begin at sunset on the previous evening and end at sunset on the date tabulated. In practice, the dates of Islamic fasts and festivals are determined by an actual sighting of the appropriate new moon.

CIVIL CALENDAR—UNITED KINGDOM

Accession of Queen Elizabeth II	Feb. 6	The Queen's Official Birthday†	June 10
St David (Wales)	Mar. 1	Birthday of Prince Philip, Duke of	
Commonwealth Day	Mar. 13	Edinburgh	June 10
St Patrick (Ireland)	Mar. 17	Remembrance Sunday	Nov. 12
Birthday of Queen Elizabeth II	Apr. 21	Birthday of the Prince of Wales	Nov. 14
St George (England)	Apr. 23	St Andrew (Scotland)	Nov. 30
Coronation Day	June 2		

PUBLIC HOLIDAYS

England and Wales—Jan. 2, Apr. 7, Apr. 10, May 1, May 29, Aug. 28, Dec. 25, Dec. 26
Northern Ireland—Jan. 2, Mar. 17, Apr. 7, Apr. 10, May 1, May 29, July 12, Aug. 28, Dec. 25, Dec. 26
Scotland Jan. 2, Jan. 3, Apr. 7, May 1, May 29, Aug. 7, Dec. 25, Dec. 26

CIVIL CALENDAR—UNITED STATES OF AMERICA

New Year's Day	Jan. 1	Labor Day	Sept. 4
Martin Luther King's Birthday	Jan. 16	Columbus Day	Oct. 9
Washington's Birthday	Feb. 20	Election Day (in certain States)	Nov. 7
Memorial Day	May 29	Veterans Day	Nov. 11
Juneteenth National Independence Day	June 19	Thanksgiving Day	Nov. 23
Independence Day	July 4		

†Dates subject to confirmation

PHASES OF THE MOON

New Moon			First Quarter			Full Moon			Last Quarter		
d	h	m	d	h	m	d	h	m	d	h	m
						Jan.	6	23 08	Jan.	15	02 10
Jan.	21	20 53	Jan.	28	15 19	Feb.	5	18 29	Feb.	13	16 01
Feb.	20	07 06	Feb.	27	08 06	Mar.	7	12 40	Mar.	15	02 08
Mar.	21	17 23	Mar.	29	02 32	Apr.	6	04 35	Apr.	13	09 11
Apr.	20	04 13	Apr.	27	21 20	May	5	17 34	May	12	14 28
May	19	15 53	May	27	15 22	June	4	03 42	June	10	19 31
June	18	04 37	June	26	07 50	July	3	11 39	July	10	01 48
July	17	18 32	July	25	22 07	Aug.	1	18 32	Aug.	8	10 28
Aug.	16	09 38	Aug.	24	09 57	Aug.	31	01 36	Sept.	6	22 21
Sept.	15	01 40	Sept.	22	19 32	Sept.	29	09 58	Oct.	6	13 48
Oct.	14	17 55	Oct.	22	03 29	Oct.	28	20 24	Nov.	5	08 37
Nov.	13	09 27	Nov.	20	10 50	Nov.	27	09 16	Dec.	5	05 49
Dec.	12	23 32	Dec.	19	18 39	Dec.	27	00 33			

DAYS OF THE WEEK AND DAYS OF THE YEAR

	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.	
Day	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr	Wk	Yr
1	Su.	1	W.	32	W.	60	Sa.	91	M.	121	Th.	152	Sa.	182	Tu.	213	F.	244	Su.	274	W.	305	F.	335
2	M.	2	Th.	33	Th.	61	Su.	92	Tu.	122	F.	153	Su.	183	W.	214	Sa.	245	M.	275	Th.	306	Sa.	336
3	Tu.	3	F.	34	F.	62	M.	93	W.	123	Sa.	154	M.	184	Th.	215	Su.	246	Tu.	276	F.	307	Su.	337
4	W.	4	Sa.	35	Sa.	63	Tu.	94	Th.	124	Su.	155	Tu.	185	F.	216	M.	247	W.	277	Sa.	308	M.	338
5	Th.	5	Su.	36	Su.	64	W.	95	F.	125	M.	156	W.	186	Sa.	217	Tu.	248	Th.	278	Su.	309	Tu.	339
6	F.	6	M.	37	M.	65	Th.	96	Sa.	126	Tu.	157	Th.	187	Su.	218	W.	249	F.	279	M.	310	W.	340
7	Sa.	7	Tu.	38	Tu.	66	F.	97	Su.	127	W.	158	F.	188	M.	219	Th.	250	Sa.	280	Tu.	311	Th.	341
8	Su.	8	W.	39	W.	67	Sa.	98	M.	128	Th.	159	Sa.	189	Tu.	220	F.	251	Su.	281	W.	312	F.	342
9	M.	9	Th.	40	Th.	68	Su.	99	Tu.	129	F.	160	Su.	190	W.	221	Sa.	252	M.	282	Th.	313	W.	343
10	Tu.	10	F.	41	F.	69	M.	100	W.	130	Sa.	161	M.	191	Th.	222	Su.	253	Tu.	283	F.	314	Su.	344
11	W.	11	Sa.	42	Sa.	70	Tu.	101	Th.	131	Su.	162	Tu.	192	F.	223	M.	254	W.	284	Sa.	315	M.	345
12	Th.	12	Su.	43	Su.	71	W.	102	F.	132	M.	163	W.	193	Sa.	224	Tu.	255	Th.	285	Su.	316	Tu.	346
13	F.	13	M.	44	M.	72	Th.	103	Sa.	133	Tu.	164	Th.	194	Su.	225	W.	256	F.	286	M.	317	W.	347
14	Sa.	14	Tu.	45	Tu.	73	F.	104	Su.	134	W.	165	F.	195	M.	226	Th.	257	Sa.	287	Tu.	318	Th.	348
15	Su.	15	W.	46	W.	74	Sa.	105	M.	135	Th.	166	Sa.	196	Tu.	227	F.	258	Su.	288	W.	319	F.	349
16	M.	16	Th.	47	Th.	75	Su.	106	Tu.	136	F.	167	Su.	197	W.	228	Sa.	259	M.	289	Th.	320	Sa.	350
17	Tu.	17	F.	48	F.	76	M.	107	W.	137	Sa.	168	M.	198	Th.	229	Su.	260	Tu.	290	F.	321	Su.	351
18	W.	18	Sa.	49	Sa.	77	Tu.	108	Th.	138	Su.	169	Tu.	199	F.	230	M.	261	W.	291	Sa.	322	M.	352
19	Th.	19	Su.	50	Su.	78	W.	109	F.	139	M.	170	W.	200	Sa.	231	Tu.	262	Th.	292	Su.	323	Tu.	353
20	F.	20	M.	51	M.	79	Th.	110	Sa.	140	Tu.	171	Th.	201	Su.	232	W.	263	F.	293	M.	324	W.	354
21	Sa.	21	Tu.	52	Tu.	80	F.	111	Su.	141	W.	172	F.	202	M.	233	Th.	264	Sa.	294	Tu.	325	Th.	355
22	Su.	22	W.	53	W.	81	Sa.	112	M.	142	Th.	173	Sa.	203	Tu.	234	F.	265	Su.	295	W.	326	F.	356
23	M.	23	Th.	54	Th.	82	Su.	113	Tu.	143	F.	174	Su.	204	W.	235	Sa.	266	M.	296	Th.	327	Sa.	357
24	Tu.	24	F.	55	F.	83	M.	114	W.	144	Sa.	175	M.	205	Th.	236	Su.	267	Tu.	297	F.	328	Su.	358
25	W.	25	Sa.	56	Sa.	84	Tu.	115	Th.	145	Su.	176	Tu.	206	F.	237	M.	268	W.	298	Sa.	329	M.	359
26	Th.	26	Su.	57	Su.	85	W.	116	F.	146	M.	177	W.	207	Sa.	238	Tu.	269	Th.	299	Su.	330	Tu.	360
27	F.	27	M.	58	M.	86	Th.	117	Sa.	147	Tu.	178	Th.	208	Su.	239	W.	270	F.	300	M.	331	W.	361
28	Sa.	28	Tu.	59	Tu.	87	F.	118	Su.	148	W.	179	F.	209	M.	240	Th.	271	Sa.	301	Th.	332	Th.	362
29	Su.	29			W.	88	Sa.	119	M.	149	Th.	180	Sa.	210	Tu.	241	F.	272	Su.	302	W.	333	F.	363
30	M.	30			Th.	89	Su.	120	Tu.	150	F.	181	Su.	211	W.	242	Sa.	273	M.	303	Th.	334	Sa.	364
31	Tu.	31			F.	90			W.	151			M.	212	Th.	243			Tu.	304			Su.	365

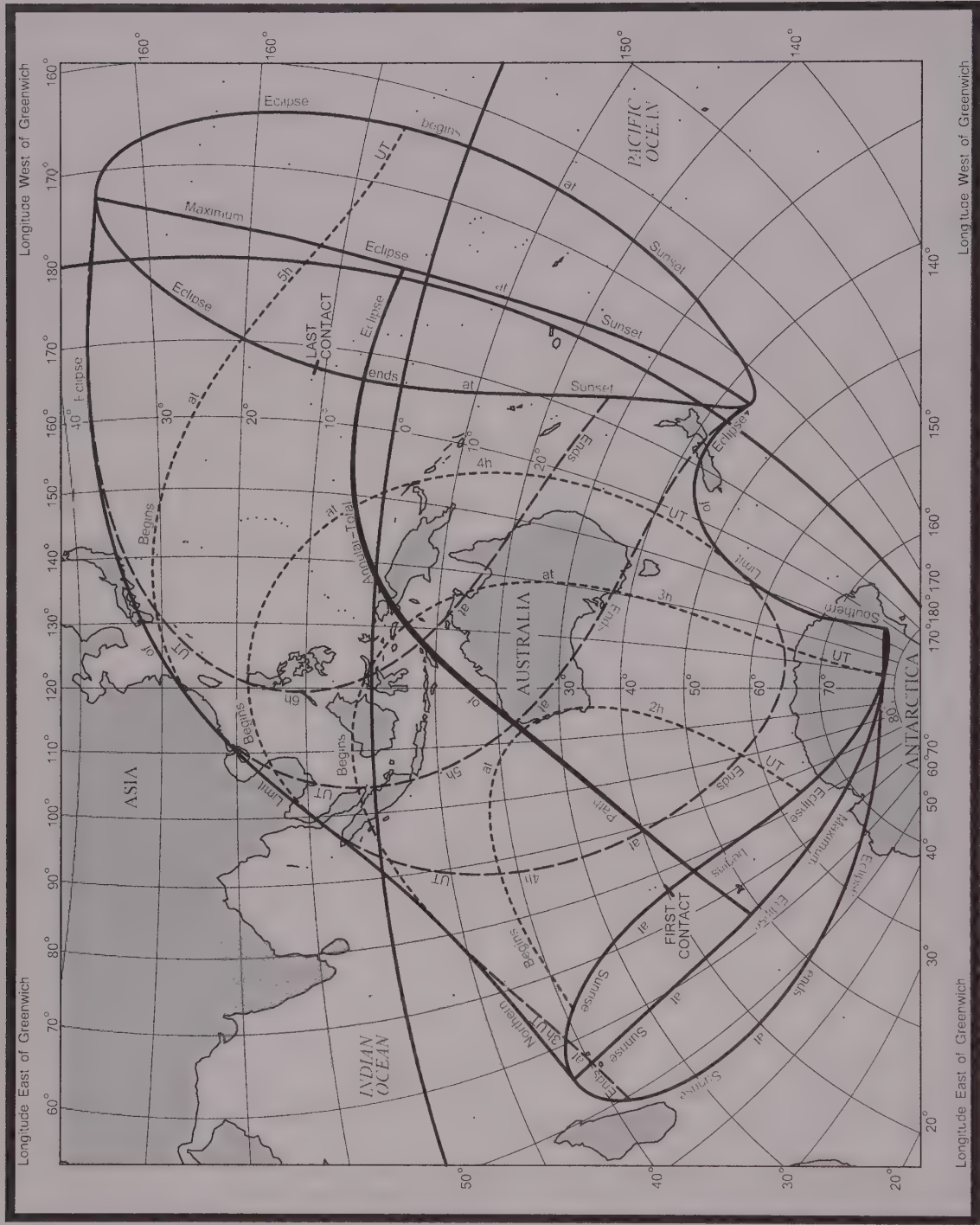
ECLIPSES

There are two eclipses of the Sun.

1. *An annular-total eclipse of the Sun*, April 20. See map page 6. The eclipse begins at 01^h 34^m and ends at 06^h 59^m; the annular-total phase begins at 02^h 37^m and ends at 05^h 57^m. The maximum duration of totality is 1^m 21^s.

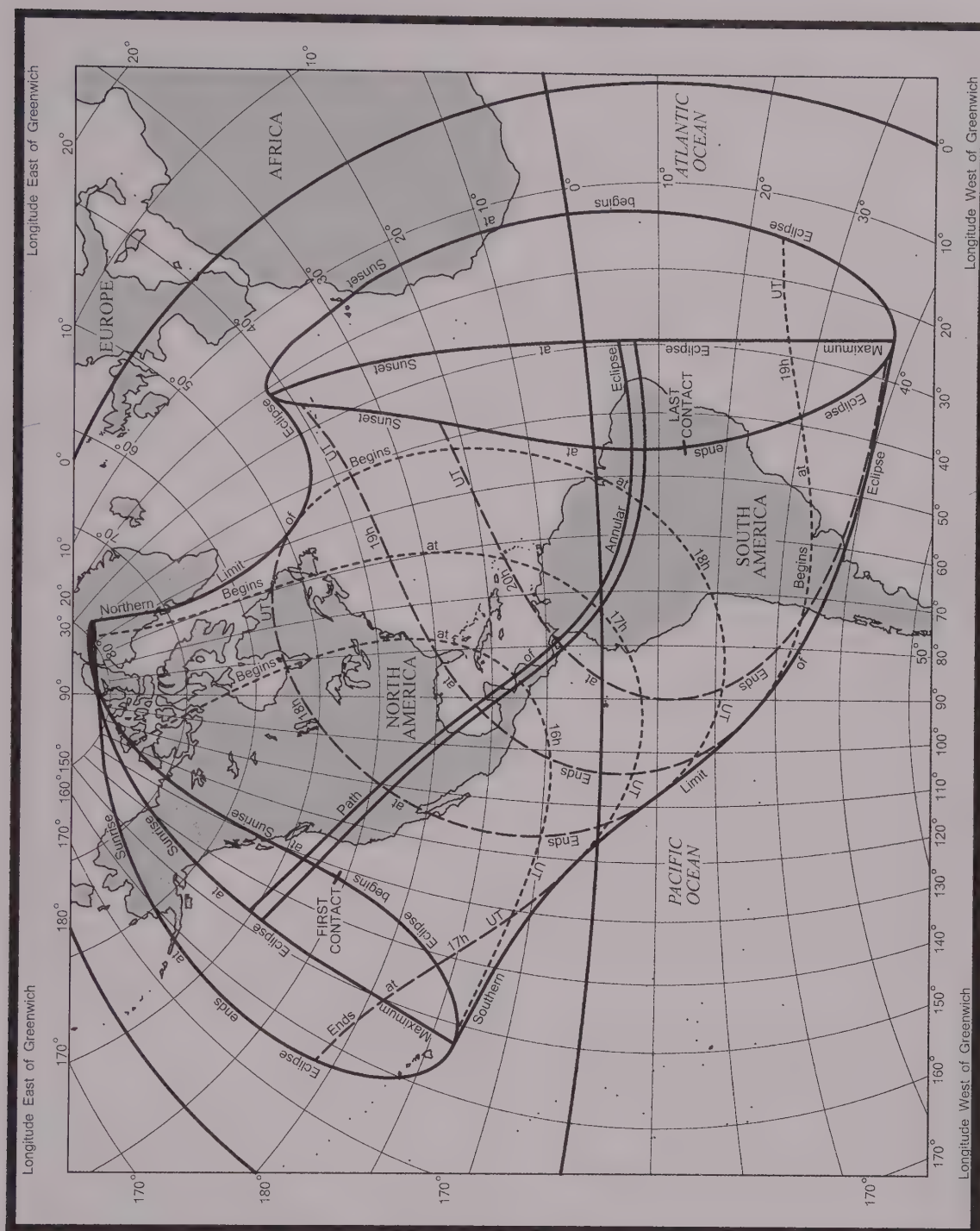
2. *An annular eclipse of the Sun*, October 14. See map on page 7. The eclipse begins at 15^h 04^m and ends at 20^h 55^m; the annular phase begins at 16^h 12^m and ends at 19^h 47^m. The maximum duration of annularity is 5^m 12^s.

3. *A partial eclipse of the Moon*, October 28. The eclipse begins at 19^h 34^m and ends at 20^h 54^m. The time of maximum eclipse is 20^h 14^m when 0.13 of the Moon's diameter is obscured. It is visible from most of Australia, Indonesia, Asia, East Antarctica, Africa, Europe, Iceland, Greenland, the easternmost part of South America and north-eastern Canada.



SOLAR ECLIPSE DIAGRAMS

The principal features shown on the above diagrams are: the paths of total and annular eclipses; the northern and southern limits of partial eclipse; the sunrise and sunset curves; dashed lines which show the times of beginning and end of partial eclipse at hourly intervals.



SOLAR ECLIPSE DIAGRAMS

Further details of the paths and times of central eclipse are given in *The Astronomical Almanac*.

VISIBILITY OF PLANETS

VENUS is a brilliant object in the evening sky from the beginning of the year until the beginning of the second week of August when it becomes too close to the Sun for observation. In the third week of August it reappears in the morning sky where it stays until the end of the year. Venus is in conjunction with Saturn on January 22, with Jupiter on March 2 and with Mercury on July 26.

MARS can be seen at the beginning of the year for more than half the night in Taurus (passing 8 deg. N of Aldebaran on February 5) and into Gemini in late March. Its eastward elongation gradually decreases until it can be seen in the evening sky, moving from Gemini (passing 5 deg. S of Pollux on May 10), through Cancer, Leo (passing 0.7 deg. N of Regulus on July 10) and into Virgo from mid August. From the beginning of October until the end of the year it is too close to the Sun for observation.

JUPITER can be seen at the beginning of the year in the evening sky in Pisces, moves into Cetus in early February and later in this month back into Pisces. From late March it becomes too close to the Sun for observation. It reappears in the morning sky in late April and moves into Aries in mid-May. Its westward elongation gradually increases until opposition on November 3. From early November its eastward elongation gradually decreases and it can be seen for more than half the night. Jupiter is in conjunction with Venus on March 2 and with Mercury on March 28.

SATURN can be seen in the evening sky from the beginning of the year in Capricornus. In late January it becomes too close to the Sun for observation until early March when it reappears in the morning sky in Aquarius. Its westward elongation gradually increases until August 27 when it is at opposition and is visible throughout the night. Its eastward elongation gradually decreases and by late November it can only be seen in the evening sky. Saturn is in conjunction with Venus on January 22.

MERCURY can only be seen low in the east before sunrise, or low in the west after sunset (about the time of beginning or end of civil twilight). It is visible in the mornings between the following approximate dates: January 13 (2.0) to March 7 (-0.9), May 11 (3.1) to June 24 (-1.5), September 14 (1.9) to October 8 (-1.2) and December 29 (1.5) to December 31 (0.8); the planet is brighter at the end of each period. It is visible in the evenings between the following approximate dates: January 1 (1.3) to January 2 (1.8), March 26 (-1.5) to April 23 (2.7), July 9 (-1.3) to August 30 (2.5) and November 5 (-0.6) to December 17 (1.6); the planet is brighter at the beginning of each period. The figures in parentheses are the magnitudes.

PLANET DIAGRAM

General Description. The diagram on the opposite page shows, in graphical form for any date during the year, the local mean time of meridian passage of the Sun, of the five planets Mercury, Venus, Mars, Jupiter, and Saturn, and of each 30° of SHA; intermediate lines corresponding to particular stars, may be drawn in by the user if desired. It is intended to provide a general picture of the availability of planets and stars for observation.

On each side of the line marking the time of meridian passage of the Sun a band, 45^m wide, is shaded to indicate that planets and most stars crossing the meridian within 45^m of the Sun are too close to the Sun for observation.

Method of use and interpretation. For any date, the diagram provides immediately the local mean times of meridian passage of the Sun, planets and stars, and thus the following information:

- whether a planet or star is too close to the Sun for observation;
- some indication of its position in the sky, especially during twilight;
- the proximity of other planets.

When the meridian passage of an outer planet occurs at midnight, the body is in opposition to the Sun and is visible all night; a planet may then be observable during both morning and evening twilights. As the time of meridian passage decreases, the body eventually ceases to be observable in the morning, but its altitude above the eastern horizon at sunset gradually increases; this continues until the body is on the meridian during evening twilight. From then onwards, the body is observable above the western horizon and its altitude at sunset gradually decreases; eventually the body becomes too close to the Sun for observation. When the body again becomes visible it is seen low in the east during morning twilight; its altitude at sunrise increases until meridian passage occurs during morning twilight. Then, as the time of meridian passage decreases to 0^h, the body is observable in the west during morning twilight with a gradually decreasing altitude, until it once again reaches opposition.

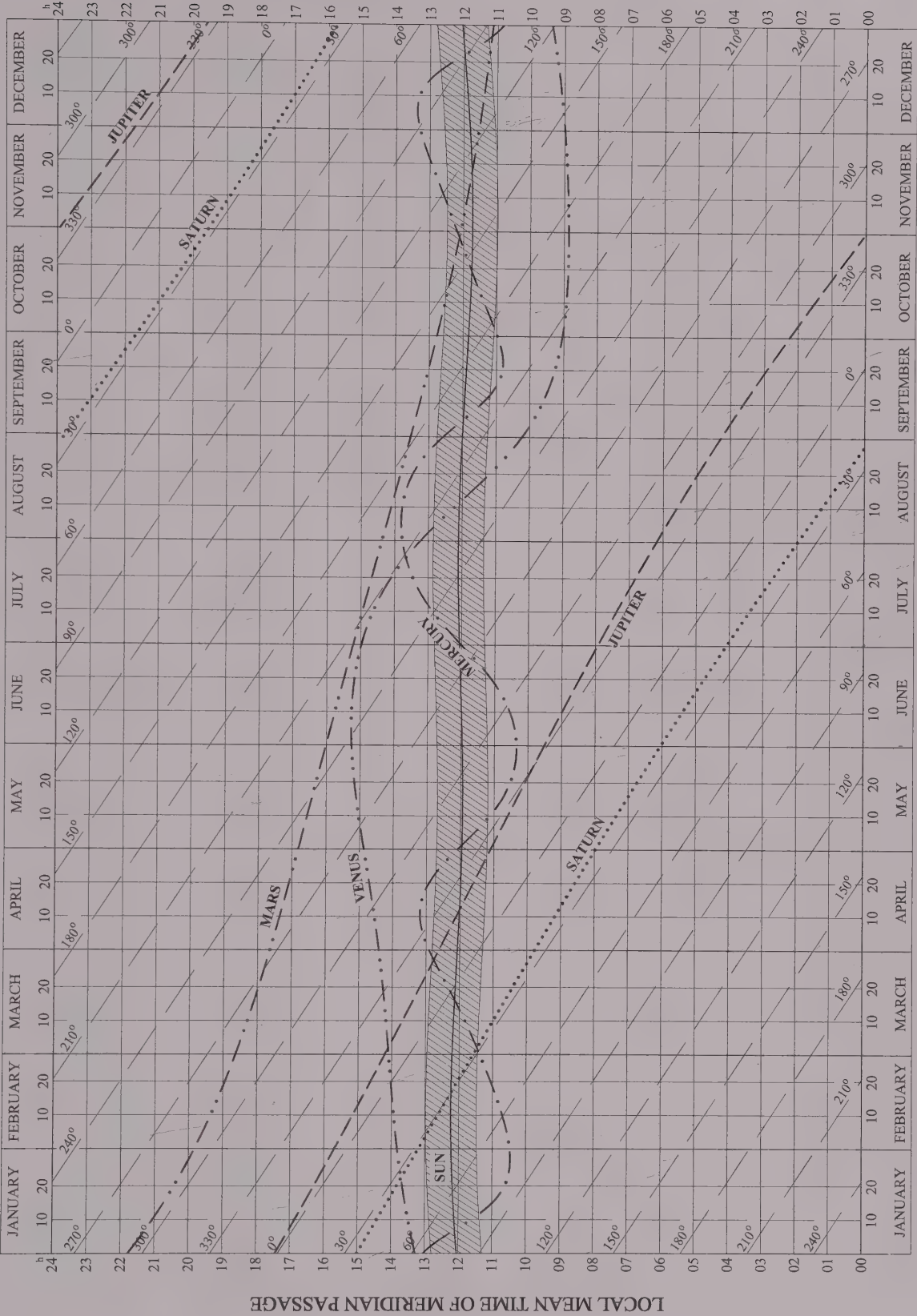
DO NOT CONFUSE

Mercury with Venus at the start of January when Venus is the brighter object and with Jupiter in late March when Jupiter is the brighter object.

Venus with Saturn in the second half of January, with Jupiter from late February until early March and with Mars from mid-June to mid-July; on all occasions Venus is the brighter object.

Mercury with Mars in mid-August where Mercury is the brighter object.

LOCAL MEAN TIME OF MERIDIAN PASSAGE



UT	ARIES		VENUS −3.9		MARS −1.2		JUPITER −2.3		SATURN +0.8		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
SUNDAY	100	100 23.3	160 39.0 S22 02.2	33 29.7 N24 35.3	98 46.9 S 0 42.4	135 11.7 S15 12.9	Acamar	315 12.8 S40 13.0					
	01	115 25.8	175 38.2 01.6	48 32.6 35.3	113 49.1 42.2	150 13.9 12.8	Achernar	335 21.3 S57 07.5					
	02	130 28.2	190 37.3 01.1	63 35.5 35.2	128 51.3 42.1	165 16.2 12.7	Acrux	173 01.9 S63 13.2					
	03	145 30.7	205 36.5 22 00.5	78 38.4 . . 35.2	143 53.5 . . 42.0	180 18.4 . . 12.6	Adhara	255 06.8 S29 00.2					
	04	160 33.2	220 35.6 21 59.9	93 41.3 35.1	158 55.7 41.9	195 20.6 12.6	Aldebaran	290 41.2 N16 33.3					
	05	175 35.6	235 34.8 59.4	108 44.2 35.1	173 57.9 41.7	210 22.8 12.5							
	06	190 38.1	250 33.9 S21 58.8	123 47.1 N24 35.0	189 00.1 S 0 41.6	225 25.0 S15 12.4	Alioth	166 14.5 N55 49.9					
	07	205 40.6	265 33.0 58.2	138 50.0 35.0	204 02.3 41.5	240 27.3 12.3	Alkaid	152 53.5 N49 11.7					
	08	220 43.0	280 32.2 57.6	153 52.9 34.9	219 04.5 41.3	255 29.5 12.2	Alnair	27 35.3 S46 51.2					
	09	235 45.5	295 31.3 . . 57.1	168 55.8 . . 34.9	234 06.7 . . 41.2	270 31.7 . . 12.1	Alnilam	275 39.1 S 1 11.3					
	10	250 48.0	310 30.5 56.5	183 58.7 34.9	249 08.8 41.1	285 33.9 12.1	Alphard	217 49.1 S 8 45.4					
	11	265 50.4	325 29.6 55.9	199 01.6 34.8	264 11.0 40.9	300 36.1 12.0							
	12	280 52.9	340 28.8 S21 55.3	214 04.4 N24 34.8	279 13.2 S 0 40.8	315 38.3 S15 11.9	Alphecca	126 05.4 N26 38.1					
	13	295 55.4	355 27.9 54.8	229 07.3 34.7	294 15.4 40.7	330 40.6 11.8	Alpheratz	357 36.6 N29 13.1					
	14	310 57.8	10 27.1 54.2	244 10.2 34.7	309 17.6 40.6	345 42.8 11.7	Altair	62 01.9 N 8 55.7					
	15	326 00.3	25 26.2 . . 53.6	259 13.1 . . 34.6	324 19.8 . . 40.4	0 45.0 . . 11.7	Ankaa	353 08.8 S42 11.2					
	16	341 02.7	40 25.4 53.0	274 16.0 34.6	339 22.0 40.3	15 47.2 11.6	Antares	112 18.2 S26 28.9					
	17	356 05.2	55 24.5 52.4	289 18.8 34.6	354 24.2 40.2	30 49.4 11.5							
	18	11 07.7	70 23.7 S21 51.8	304 21.7 N24 34.5	9 26.3 S 0 40.0	45 51.7 S15 11.4	Arcturus	145 49.6 N19 03.7					
	19	26 10.1	85 22.8 51.3	319 24.6 34.5	24 28.5 39.9	60 53.9 11.3	Atria	107 14.5 S69 03.9					
	20	41 12.6	100 22.0 50.7	334 27.4 34.4	39 30.7 39.8	75 56.1 11.2	Avior	234 14.8 S59 34.8					
	21	56 15.1	115 21.1 . . 50.1	349 30.3 . . 34.4	54 32.9 . . 39.6	90 58.3 . . 11.2	Bellatrix	278 24.3 N 6 22.2					
	22	71 17.5	130 20.3 49.5	4 33.2 34.3	69 35.1 39.5	106 00.5 11.1	Betelgeuse	270 53.6 N 7 24.7					
	23	86 20.0	145 19.4 48.9	19 36.0 34.3	84 37.3 39.4	121 02.8 11.0							
MONDAY	200	101 22.5	160 18.6 S21 48.3	34 38.9 N24 34.3	99 39.5 S 0 39.2	136 05.0 S15 10.9	Canopus	263 52.6 S52 42.5					
	01	116 24.9	175 17.7 47.7	49 41.8 34.2	114 41.6 39.1	151 07.2 10.8	Capella	280 23.9 N46 01.3					
	02	131 27.4	190 16.9 47.1	64 44.6 34.2	129 43.8 39.0	166 09.4 10.7	Deneb	49 27.4 N45 21.8					
	03	146 29.8	205 16.0 . . 46.5	79 47.5 . . 34.1	144 46.0 . . 38.8	181 11.6 . . 10.7	Denebola	182 26.6 N14 26.6					
	04	161 32.3	220 15.2 45.9	94 50.3 34.1	159 48.2 38.7	196 13.8 10.6	Diphda	348 49.0 S17 51.8					
	05	176 34.8	235 14.4 45.3	109 53.2 34.1	174 50.4 38.6	211 16.1 10.5							
	06	191 37.2	250 13.5 S21 44.7	124 56.1 N24 34.0	189 52.6 S 0 38.4	226 18.3 S15 10.4	Dubhe	193 42.8 N61 37.4					
	07	206 39.7	265 12.7 44.1	139 58.9 34.0	204 54.8 38.3	241 20.5 10.3	Elnath	278 03.6 N28 37.6					
	08	221 42.2	280 11.8 43.5	155 01.8 33.9	219 56.9 38.2	256 22.7 10.2	Eltanin	90 43.5 N51 29.0					
	09	236 44.6	295 11.0 . . 42.9	170 04.6 . . 33.9	234 59.1 . . 38.0	271 24.9 . . 10.2	Enif	33 40.7 N 9 58.8					
	10	251 47.1	310 10.1 42.3	185 07.5 33.8	250 01.3 37.9	286 27.1 10.1	Fomalhaut	15 16.5 S29 30.3					
	11	266 49.6	325 09.3 41.7	200 10.3 33.8	265 03.5 37.8	301 29.4 10.0							
	12	281 52.0	340 08.5 S21 41.1	215 13.1 N24 33.8	280 05.7 S 0 37.7	316 31.6 S15 09.9	Gacrux	171 53.5 S57 14.2					
	13	296 54.5	355 07.6 40.5	230 16.0 33.7	295 07.9 37.5	331 33.8 09.8	Gienah	175 45.3 S17 40.0					
	14	311 57.0	10 06.8 39.9	245 18.8 33.7	310 10.0 37.4	346 36.0 09.7	Hadar	148 38.6 S60 28.7					
	15	326 59.4	25 05.9 . . 39.3	260 21.7 . . 33.6	325 12.2 . . 37.3	1 38.2 . . 09.7	Hamal	327 52.9 N23 34.3					
	16	342 01.9	40 05.1 38.7	275 24.5 33.6	340 14.4 37.1	16 40.4 09.6	Kaus Aust.	83 35.1 S34 22.4					
	17	357 04.3	55 04.3 38.0	290 27.3 33.6	355 16.6 37.0	31 42.7 09.5							
	18	12 06.8	70 03.4 S21 37.4	305 30.2 N24 33.5	10 18.8 S 0 36.8	46 44.9 S15 09.4	Kochab	137 20.4 N74 03.4					
	19	27 09.3	85 02.6 36.8	320 33.0 33.5	25 20.9 36.7	61 47.1 09.3	Markab	13 31.7 N15 19.7					
	20	42 11.7	100 01.8 36.2	335 35.8 33.4	40 23.1 36.6	76 49.3 09.2	Menkar	314 07.7 N 4 10.7					
	21	57 14.2	115 00.9 . . 35.6	350 38.7 . . 33.4	55 25.3 . . 36.4	91 51.5 . . 09.2	Menkent	147 59.7 S36 28.8					
	22	72 16.7	130 00.1 35.0	5 41.5 33.4	70 27.5 36.3	106 53.7 09.1	Miaplacidus	221 37.8 S69 48.4					
	23	87 19.1	144 59.2 34.4	20 44.3 33.3	85 29.7 36.2	121 56.0 09.0							
TUESDAY	300	102 21.6	159 58.4 S21 33.7	35 47.2 N24 33.3	100 31.8 S 0 36.0	136 58.2 S15 08.9	Mirfak	308 30.3 N49 56.7					
	01	117 24.1	174 57.6 33.1	50 50.0 33.2	115 34.0 35.9	152 00.4 08.8	Nunki	75 50.2 S26 16.1					
	02	132 26.5	189 56.7 32.5	65 52.8 33.2	130 36.2 35.8	167 02.6 08.7	Peacock	53 08.9 S56 39.8					
	03	147 29.0	204 55.9 . . 31.9	80 55.6 . . 33.2	145 38.4 . . 35.6	182 04.8 . . 08.7	Pollux	243 19.0 N27 58.2					
	04	162 31.5	219 55.1 31.2	95 58.4 33.1	160 40.6 35.5	197 07.0 08.6	Procyon	244 52.3 N 5 09.9					
	05	177 33.9	234 54.2 30.6	111 01.3 33.1	175 42.7 35.4	212 09.3 08.5							
	06	192 36.4	249 53.4 S21 30.0	126 04.1 N24 33.1	190 44.9 S 0 35.2	227 11.5 S15 08.4	Rasalhague	96 00.4 N12 32.5					
	07	207 38.8	264 52.6 29.4	141 06.9 33.0	205 47.1 35.1	242 13.7 08.3	Regulus	207 36.0 N11 51.3					
	08	222 41.3	279 51.8 28.7	156 09.7 33.0	220 49.3 35.0	257 15.9 08.2	Rigel	281 05.2 S 8 10.6					
	09	237 43.8	294 50.9 . . 28.1	171 12.5 . . 32.9	235 51.4 . . 34.8	272 18.1 . . 08.2	Rigel Kent.	139 42.9 S60 55.5					
	10	252 46.2	309 50.1 27.5	186 15.3 32.9	250 53.6 34.7	287 20.3 08.1	Sabik	102 05.0 S15 45.2					
	11	267 48.7	324 49.3 26.8	201 18.1 32.9	265 55.8 34.6	302 22.5 08.0							
	12	282 51.2	339 48.4 S21 26.2	216 20.9 N24 32.8	280 58.0 S 0 34.4	317 24.8 S15 07.9	Schedar	349 32.9 N56 40.0					
	13	297 53.6	354 47.6 25.6	231 23.7 32.8	296 00.2 34.3	332 27.0 07.8	Shaula	96 13.1 S37 07.2					
	14	312 56.1	9 46.8 24.9	246 26.5 32.7	311 02.3 34.2	347 29.2 07.7	Sirius	258 27.4 S16 44.9					
	15	327 58.6	24 46.0 . . 24.3	261 29.3 . . 32.7	326 04.5 . . 34.0	2 31.4 . . 07.7	Spica	158 24.1 S11 16.8					
	16	343 01.0	39 45.1 23.7	276 32.1 32.7	341 06.7 33.9	17 33.6 07.6	Suhail	222 47.2 S43 31.3					
	17	358 03.5	54 44.3 23.0	291 34.9 32.6	356 08.9 33.7	32 35.8 07.5							
	18	13 06.0	69 43.5 S21 22.4	306 37.7 N24 32.6	11 11.0 S 0 33.6	47 38.0 S15 07.4	Vega	80 34.8 N38 48.2					
	19	28 08.4	84 42.7 21.7	321 40.5 32.6	26 13.2 33.5	62 40.3 07.3	Zuben'ubi	136 58.1 S16 08.1					
	20	43 10.9	99 41.8 21.1	336 43.3 32.5	41 15.4 33.3	77 42.5 07.2							
	21	58 13.3	114 41.0 . . 20.5	351 46.1 . . 32.5	56 17.6 . . 33.2	92 44.7 . . 07.1							
	22	73 15.8	129 40.2 19.8	6 48.9 32.5	71 19.7 33.1	107 46.9 07.1	Venus	58 56.1 13 20					
	23	88 18.3	144 39.4 19.2	21 51.7 32.4	86 21.9 32.9	122 49.1 07.0	Mars	293 16.4 21 37					
		Mer. Pass. 17 11.7		v −0.8 d 0.6		v 2.8 d 0.0		v 2.2 d 0.1		v 2.2 d 0.1		Jupiter	
												Saturn	
												34 42.5 14 53	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec			GHA	v	Dec	d		HP	Naut.		Civil	1	2	3	4
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	
SUNDAY	100	179 12.0	S23 02.4		68 43.6	13.8	N12 03.2	13.4	56.3	N 72	08 23	10 40		10 20			
	01	194 11.7		02.2	83 16.4	13.8	12 16.6	13.3	56.3	N 70	08 04	09 48		10 47	09 50		
	02	209 11.4		02.0	97 49.2	13.8	12 29.9	13.3	56.2	68	07 49	09 16		11 08	10 36		
	03	224 11.1		01.8	112 22.0	13.8	12 43.2	13.1	56.2	66	07 37	08 52	10 26	11 25	11 07	10 34	
	04	239 10.8		01.6	126 54.8	13.7	12 56.3	13.2	56.2	64	07 26	08 34	09 49	11 39	11 30	11 18	
	05	254 10.5		01.4	141 27.5	13.7	13 09.5	13.0	56.2	62	07 17	08 18	09 22	11 50	11 48	11 47	
	06	269 10.2	S23 01.2		156 00.2	13.7	N13 22.5	13.0	56.1	60	07 09	08 05	09 02	12 00	12 03	12 10	
	07	284 09.9		01.0	170 32.9	13.6	13 35.5	12.9	56.1	N 58	07 02	07 54	08 45	12 09	12 16	12 28	
	08	299 09.6		00.8	185 05.5	13.6	13 48.4	12.8	56.1	56	06 55	07 44	08 31	12 17	12 28	12 43	
	09	314 09.3		00.6	199 38.1	13.6	14 01.2	12.8	56.0	54	06 50	07 35	08 19	12 24	12 38	12 57	
	10	329 09.0		00.4	214 10.7	13.6	14 14.0	12.7	56.0	52	06 44	07 27	08 08	12 30	12 47	13 08	
	11	344 08.7		00.2	228 43.3	13.5	14 26.7	12.6	56.0	50	06 39	07 20	07 58	12 35	12 55	13 19	
	12	359 08.4	S23 00.0		243 15.8	13.5	N14 39.3	12.5	56.0	45	06 28	07 05	07 38	12 48	13 12	13 40	
	13	14 08.2	22 59.8		257 48.3	13.5	14 51.8	12.5	55.9	N 40	06 18	06 52	07 22	12 58	13 26	13 58	
	14	29 07.9	59.6		272 20.8	13.4	15 04.3	12.4	55.9	35	06 09	06 40	07 08	13 07	13 38	14 13	
	15	44 07.6	59.3		286 53.2	13.4	15 16.7	12.3	55.9	30	06 00	06 30	06 56	13 14	13 48	14 26	
	16	59 07.3	59.1		301 25.6	13.4	15 29.0	12.2	55.9	20	05 44	06 11	06 35	13 28	14 06	14 48	
	17	74 07.0	58.9		315 58.0	13.3	15 41.2	12.1	55.8	N 10	05 28	05 54	06 17	13 40	14 22	15 07	
	18	89 06.7	S22 58.7		330 30.3	13.3	N15 53.3	12.1	55.8	0	05 12	05 38	06 00	13 51	14 37	15 25	
	19	104 06.4	58.5		345 02.6	13.2	16 05.4	12.0	55.8	S 10	04 53	05 20	05 43	14 02	14 52	15 43	
	20	119 06.1	58.3		359 34.8	13.2	16 17.4	11.9	55.8	20	04 31	05 00	05 24	14 14	15 08	16 03	
	21	134 05.8	58.1		14 07.0	13.2	16 29.3	11.9	55.8	30	04 02	04 36	05 03	14 28	15 27	16 26	
	22	149 05.5	57.9		28 39.2	13.1	16 41.2	11.7	55.7	35	03 44	04 21	04 50	14 36	15 38	16 39	
23	164 05.2	57.6		43 11.3	13.1	16 52.9	11.7	55.7	40	03 22	04 03	04 35	14 45	15 51	16 55		
MONDAY	00	179 04.9	S22 57.4		57 43.4	13.1	N17 04.6	11.6	55.7	45	02 52	03 41	04 18	14 56	16 05	17 13	
	01	194 04.6	57.2		72 15.5	13.0	17 16.2	11.4	55.7	S 50	02 08	03 12	03 56	15 10	16 24	17 37	
	02	209 04.3	57.0		86 47.5	13.0	17 27.6	11.5	55.6	52	01 42	02 57	03 45	15 16	16 33	17 48	
	03	224 04.1	56.8		101 19.5	12.9	17 39.1	11.3	55.6	54	01 03	02 40	03 34	15 23	16 42	18 00	
	04	239 03.8	56.6		115 51.4	12.9	17 50.4	11.2	55.6	56	////	02 19	03 20	15 31	16 54	18 15	
	05	254 03.5	56.3		130 23.3	12.8	18 01.6	11.2	55.6	58	////	01 51	03 04	15 39	17 06	18 33	
	06	269 03.2	S22 56.1		144 55.1	12.8	N18 12.8	11.0	55.5	S 60	////	01 08	02 44	15 49	17 22	18 54	
	07	284 02.9	55.9		159 26.9	12.8	18 23.8	11.0	55.5	Lat.		Sunset	Twilight		Moonset		
	08	299 02.6	55.7		173 58.7	12.7	18 34.8	10.9	55.5				Civil	Naut.	1	2	
	09	314 02.3	55.5		188 30.4	12.7	18 45.7	10.7	55.5						3	4	
	10	329 02.0	55.2		203 02.1	12.6	18 56.4	10.7	55.5								
	11	344 01.7	55.0		217 33.7	12.6	19 07.1	10.6	55.4	N 72		13 28	15 45	04 33			
	12	359 01.4	S22 54.8		232 05.3	12.5	N19 17.7	10.5	55.4	N 70		14 20	16 04	04 08	06 41		
	13	14 01.1	54.6		246 36.8	12.5	19 28.2	10.4	55.4	68		14 52	16 19	03 49	05 56		
	14	29 00.8	54.3		261 08.3	12.4	19 38.6	10.4	55.4	66	13 42	15 16	16 31	03 33	05 27	07 39	
	15	44 00.6	54.1		275 39.7	12.4	19 49.0	10.2	55.3	64	14 19	15 34	16 42	03 21	05 05	06 56	
	16	59 00.3	53.9		290 11.1	12.4	19 59.2	10.1	55.3	62	14 46	15 50	16 51	03 11	04 47	06 27	
	17	74 00.0	53.7		304 42.5	12.3	20 09.3	10.0	55.3	60	15 06	16 03	16 59	03 02	04 33	06 05	
	18	88 59.7	S22 53.4		319 13.8	12.2	N20 19.3	9.9	55.3	N 58	15 23	16 14	17 06	02 54	04 21	05 48	
	19	103 59.4	53.2		333 45.0	12.2	20 29.2	9.9	55.3	56	15 37	16 24	17 13	02 47	04 10	05 33	
	20	118 59.1	53.0		348 16.2	12.2	20 39.1	9.7	55.2	54	15 49	16 33	17 18	02 41	04 01	05 20	
	21	133 58.8	52.7		2 47.4	12.1	20 48.8	9.6	55.2	52	16 00	16 41	17 24	02 36	03 53	05 09	
	22	148 58.5	52.5		17 18.5	12.0	20 58.4	9.5	55.2	50	16 10	16 48	17 29	02 31	03 45	04 59	
23	163 58.2	52.3		31 49.5	12.1	21 07.9	9.4	55.2	45	16 30	17 03	17 40	02 20	03 30	04 38		
TUESDAY	00	178 58.0	S22 52.0		46 20.6	11.9	N21 17.3	9.4	55.2	N 40	16 46	17 16	17 50	02 11	03 17	04 22	
	01	193 57.7	51.8		60 51.5	12.0	21 26.7	9.2	55.2	35	17 00	17 28	17 59	02 04	03 06	04 08	
	02	208 57.4	51.6		75 22.5	11.8	21 35.9	9.1	55.1	30	17 12	17 38	18 08	01 57	02 56	03 55	
	03	223 57.1	51.3		89 53.3	11.8	21 45.0	9.0	55.1	20	17 33	17 56	18 24	01 46	02 40	03 35	
	04	238 56.8	51.1		104 24.1	11.8	21 54.0	8.9	55.1	N 10	17 51	18 13	18 40	01 36	02 26	03 17	
	05	253 56.5	50.8		118 54.9	11.8	22 02.9	8.7	55.1	0	18 08	18 30	18 56	01 27	02 13	03 00	
	06	268 56.2	S22 50.6		133 25.7	11.6	N22 11.6	8.7	55.1	S 10	18 25	18 48	19 15	01 18	02 00	02 43	
	07	283 55.9	50.4		147 56.3	11.7	22 20.3	8.6	55.0	20	18 43	19 08	19 37	01 08	01 46	02 26	
	08	298 55.7	50.1		162 27.0	11.6	22 28.9	8.4	55.0	30	19 05	19 32	20 05	00 57	01 30	02 05	
	09	313 55.4	49.9		176 57.6	11.5	22 37.3	8.4	55.0	35	19 17	19 47	20 23	00 51	01 21	01 53	
	10	328 55.1	49.6		191 28.1	11.5	22 45.7	8.2	55.0	40	19 32	20 05	20 46	00 44	01 10	01 40	
	11	343 54.8	49.4		205 58.6	11.4	22 53.9	8.2	55.0	45	19 50	20 27	21 15	00 36	00 58	01 24	
	12	358 54.5	S22 49.2		220 29.0	11.4	N23 02.1	8.0	55.0	S 50	20 11	20 55	21 59	00 26	00 43	01 04	
	13	13 54.2	48.9		234 59.4	11.4	23 10.1	7.9	54.9	52	20 22	21 10	22 24	00 21	00 36	00 55	
	14	28 53.9	48.7		249 29.8	11.3	23 18.0	7.8	54.9	54	20 34	21 27	23 03	00 16	00 28	00 45	
	15	43 53.6	48.4		264 00.1	11.2	23 25.8	7.6	54.9	56	20 47	21 48	////	00 10	00 20	00 33	
	16	58 53.4	48.2		278 30.3	11.2	23 33.4	7.6	54.9	58	21 03	22 15	////	00 04	00 10	00 19	
	17	73 53.1	47.9		293 00.5	11.2	23 41.0	7.4	54.9	S 60	21 23	22 57	////	23 59	24 04	00 04	
	18	88 52.8	S22 47.7		307 30.7	11.1	N23 48.4	7.4	54.9	SUN		MOON					
	19	103 52.5	47.4		322 00.8	11.1	23 55.8	7.2	54.8	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase
	20	118 52.2	47.2		336 30.9	11.0	24 03.0	7.1	54.8		00 ^h 12 ^h		Pass.	Upper	Lower		
	21	133 51.9	46.9		351 00.9	11.0	24 10.1	6.9	54.8	d	m s	m s	h m	h m	h m	d %	
	22	148 51.6	46.7		5 30.9	11.0	24 17.0	6.9	54.8	1	03 11	03 26	12 03	20 02	07 39	09 74	
23	163 51.4	46.4		20 00.9	10.9	N24 23.9	6.7	54.8	2	03 40	03 54	12 04	20 48	08 25	10 83		
	SD 16.3	d 0.2		SD 15.3	15.1	15.0			3	04 08	04 21	12 04	21 37	09 13	11 89		

UT	ARIES		VENUS −3.9		MARS −1.1		JUPITER −2.3		SATURN +0.8		STARS		
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA	Dec			
WEDNESDAY	4 00	103 20.7	159 38.5 S21 18.5	36 54.5 N24 32.4	101 24.1 S 0 32.8	137 51.3 S15 06.9	Acamar	315 12.8	S40 13.0				
	01	118 23.2	174 37.7 17.9	51 57.3 32.3	116 26.3 32.7	152 53.5 06.8	Achernar	335 21.3	S57 07.5				
	02	133 25.7	189 36.9 17.2	67 00.1 32.3	131 28.4 32.5	167 55.8 06.7	Acruhs	173 01.8	S63 13.2				
	03	148 28.1	204 36.1 . . 16.6	82 02.9 . . 32.3	146 30.6 . . 32.4	182 58.0 . . 06.6	Adhara	255 06.8	S29 00.2				
	04	163 30.6	219 35.3 15.9	97 05.6 32.2	161 32.8 32.2	198 00.2 06.6	Aldebaran	290 41.2	N16 33.3				
	05	178 33.1	234 34.4 15.3	112 08.4 32.2	176 34.9 32.1	213 02.4 06.5							
	06	193 35.5	249 33.6 S21 14.6	127 11.2 N24 32.2	191 37.1 S 0 32.0	228 04.6 S15 06.4	Alioth	166 14.4	N55 49.9				
	07	208 38.0	264 32.8 14.0	142 14.0 32.1	206 39.3 31.8	243 06.8 06.3	Alkaid	152 53.5	N49 11.7				
	08	223 40.5	279 32.0 13.3	157 16.7 32.1	221 41.5 31.7	258 09.0 06.2	Alnair	27 35.3	S46 51.2				
	09	238 42.9	294 31.2 . . 12.7	172 19.5 . . 32.1	236 43.6 . . 31.6	273 11.3 . . 06.1	Alnilam	275 39.1	S 1 11.3				
	10	253 45.4	309 30.3 12.0	187 22.3 32.0	251 45.8 31.4	288 13.5 06.0	Alphard	217 49.1	S 8 45.4				
	11	268 47.8	324 29.5 11.3	202 25.1 32.0	266 48.0 31.3	303 15.7 06.0							
	12	283 50.3	339 28.7 S21 10.7	217 27.8 N24 32.0	281 50.1 S 0 31.1	318 17.9 S15 05.9	Alphecca	126 05.4	N26 38.1				
	13	298 52.8	354 27.9 10.0	232 30.6 31.9	296 52.3 31.0	333 20.1 05.8	Alpheratz	357 36.6	N29 13.1				
	14	313 55.2	9 27.1 09.4	247 33.4 31.9	311 54.5 30.9	348 22.3 05.7	Altair	62 01.9	N 8 55.7				
	15	328 57.7	24 26.3 . . 08.7	262 36.1 . . 31.8	326 56.7 . . 30.7	3 24.5 . . 05.6	Ankaa	353 08.9	S42 11.2				
	16	344 00.2	39 25.4 08.0	277 38.9 31.8	341 58.8 30.6	18 26.7 05.5	Antares	112 18.2	S26 28.9				
	17	359 02.6	54 24.6 07.4	292 41.7 31.8	357 01.0 30.4	33 29.0 05.5							
	18	14 05.1	69 23.8 S21 06.7	307 44.4 N24 31.7	12 03.2 S 0 30.3	48 31.2 S15 05.4	Arcturus	145 49.6	N19 03.7				
	19	29 07.6	84 23.0 06.0	322 47.2 31.7	27 05.3 30.2	63 33.4 05.3	Atria	107 14.4	S69 03.9				
	20	44 10.0	99 22.2 05.4	337 49.9 31.7	42 07.5 30.0	78 35.6 05.2	Avior	234 14.8	S59 34.8				
	21	59 12.5	114 21.4 . . 04.7	352 52.7 . . 31.6	57 09.7 . . 29.9	93 37.8 . . 05.1	Bellatrix	278 24.3	N 6 22.2				
	22	74 14.9	129 20.6 04.0	7 55.4 31.6	72 11.8 29.8	108 40.0 05.0	Betelgeuse	270 53.6	N 7 24.7				
	23	89 17.4	144 19.8 03.4	22 58.2 31.6	87 14.0 29.6	123 42.2 04.9							
	THURSDAY	5 00	104 19.9	159 19.0 S21 02.7	38 00.9 N24 31.5	102 16.2 S 0 29.5	138 44.4 S15 04.9	Canopus	263 52.6	S52 42.5			
01		119 22.3	174 18.1 02.0	53 03.7 31.5	117 18.3 29.3	153 46.7 04.8	Capella	280 23.9	N46 01.3				
02		134 24.8	189 17.3 01.3	68 06.4 31.5	132 20.5 29.2	168 48.9 04.7	Deneb	49 27.4	N45 21.8				
03		149 27.3	204 16.5 . . 00.7	83 09.2 . . 31.4	147 22.7 . . 29.1	183 51.1 . . 04.6	Denebola	182 26.6	N14 26.6				
04		164 29.7	219 15.7 21 00.0	98 11.9 31.4	162 24.8 28.9	198 53.3 04.5	Diphda	348 49.0	S17 51.8				
05		179 32.2	234 14.9 20 59.3	113 14.7 31.4	177 27.0 28.8	213 55.5 04.4							
06		194 34.7	249 14.1 S20 58.6	128 17.4 N24 31.3	192 29.2 S 0 28.6	228 57.7 S15 04.3	Dubhe	193 42.7	N61 37.4				
07		209 37.1	264 13.3 58.0	143 20.1 31.3	207 31.3 28.5	243 59.9 04.3	Elnath	278 03.6	N28 37.6				
08		224 39.6	279 12.5 57.3	158 22.9 31.3	222 33.5 28.4	259 02.1 04.2	Eltanin	90 43.5	N51 29.0				
09		239 42.1	294 11.7 . . 56.6	173 25.6 . . 31.2	237 35.7 . . 28.2	274 04.3 . . 04.1	Enif	33 40.7	N 9 58.8				
10		254 44.5	309 10.9 55.9	188 28.4 31.2	252 37.8 28.1	289 06.6 04.0	Fomalhaut	15 16.5	S29 30.3				
11		269 47.0	324 10.1 55.2	203 31.1 31.2	267 40.0 27.9	304 08.8 03.9							
12		284 49.4	339 09.3 S20 54.5	218 33.8 N24 31.2	282 42.2 S 0 27.8	319 11.0 S15 03.8	Gacrux	171 53.4	S57 14.2				
13		299 51.9	354 08.5 53.9	233 36.5 31.1	297 44.3 27.7	334 13.2 03.8	Gienah	175 45.2	S17 40.0				
14		314 54.4	9 07.7 53.2	248 39.3 31.1	312 46.5 27.5	349 15.4 03.7	Hadar	148 38.6	S60 28.7				
15		329 56.8	24 06.9 . . 52.5	263 42.0 . . 31.1	327 48.7 . . 27.4	4 17.6 . . 03.6	Hamal	327 53.0	N23 34.3				
16		344 59.3	39 06.1 51.8	278 44.7 31.0	342 50.8 27.2	19 19.8 03.5	Kaus Aust.	83 35.1	S34 22.4				
17		0 01.8	54 05.3 51.1	293 47.5 31.0	357 53.0 27.1	34 22.0 03.4							
18		15 04.2	69 04.5 S20 50.4	308 50.2 N24 31.0	12 55.1 S 0 27.0	49 24.2 S15 03.3	Kochab	137 20.4	N74 03.4				
19		30 06.7	84 03.7 49.7	323 52.9 30.9	27 57.3 26.8	64 26.5 03.2	Markab	13 31.7	N15 19.7				
20		45 09.2	99 02.9 49.0	338 55.6 30.9	42 59.5 26.7	79 28.7 03.2	Menkar	314 07.7	N 4 10.7				
21		60 11.6	114 02.1 . . 48.3	353 58.3 . . 30.9	58 01.6 . . 26.5	94 30.9 . . 03.1	Menkent	147 59.7	S36 28.8				
22		75 14.1	129 01.3 47.6	9 01.0 30.8	73 03.8 26.4	109 33.1 03.0	Miaplacidus	221 37.8	S69 48.4				
23		90 16.6	144 00.5 46.9	24 03.8 30.8	88 06.0 26.2	124 35.3 02.9							
FRIDAY		6 00	105 19.0	158 59.7 S20 46.2	39 06.5 N24 30.8	103 08.1 S 0 26.1	139 37.5 S15 02.8	Mirfak	308 30.3	N49 56.7			
	01	120 21.5	173 58.9 45.5	54 09.2 30.8	118 10.3 26.0	154 39.7 02.7	Nunki	75 50.2	S26 16.1				
	02	135 23.9	188 58.1 44.8	69 11.9 30.7	133 12.4 25.8	169 41.9 02.6	Peacock	53 08.9	S56 39.8				
	03	150 26.4	203 57.3 . . 44.1	84 14.6 . . 30.7	148 14.6 . . 25.7	184 44.1 . . 02.6	Pollux	243 19.0	N27 58.2				
	04	165 28.9	218 56.5 43.4	99 17.3 30.7	163 16.8 25.5	199 46.3 02.5	Procyon	244 52.2	N 5 09.9				
	05	180 31.3	233 55.7 42.7	114 20.0 30.6	178 18.9 25.4	214 48.6 02.4							
	06	195 33.8	248 54.9 S20 42.0	129 22.7 N24 30.6	193 21.1 S 0 25.3	229 50.8 S15 02.3	Rasalhague	96 00.4	N12 32.5				
	07	210 36.3	263 54.1 41.3	144 25.4 30.6	208 23.3 25.1	244 53.0 02.2	Regulus	207 36.0	N11 51.3				
	08	225 38.7	278 53.3 40.6	159 28.1 30.5	223 25.4 25.0	259 55.2 02.1	Rigel	281 05.2	S 8 10.6				
	09	240 41.2	293 52.5 . . 39.9	174 30.8 . . 30.5	238 27.6 . . 24.8	274 57.4 . . 02.0	Rigel Kent.	139 42.9	S60 55.5				
	10	255 43.7	308 51.7 39.2	189 33.5 30.5	253 29.7 24.7	289 59.6 02.0	Sabik	102 05.0	S15 45.2				
	11	270 46.1	323 50.9 38.5	204 36.2 30.5	268 31.9 24.5	305 01.8 01.9							
	12	285 48.6	338 50.2 S20 37.8	219 38.9 N24 30.4	283 34.0 S 0 24.4	320 04.0 S15 01.8	Schedar	349 33.0	N56 40.0				
	13	300 51.1	353 49.4 37.1	234 41.6 30.4	298 36.2 24.3	335 06.2 01.7	Shaula	96 13.0	S37 07.2				
	14	315 53.5	8 48.6 36.4	249 44.3 30.4	313 38.4 24.1	350 08.4 01.6	Sirius	258 27.3	S16 44.9				
	15	330 56.0	23 47.8 . . 35.7	264 47.0 . . 30.3	328 40.5 . . 24.0	5 10.6 . . 01.5	Spica	158 24.1	S11 16.8				
	16	345 58.4	38 47.0 34.9	279 49.7 30.3	343 42.7 23.8	20 12.9 01.4	Suhail	222 47.1	S43 31.4				
	17	1 00.9	53 46.2 34.2	294 52.4 30.3	358 44.8 23.7	35 15.1 01.3							
	18	16 03.4	68 45.4 S20 33.5	309 55.0 N24 30.3	13 47.0 S 0 23.5	50 17.3 S15 01.3	Vega	80 34.8	N38 48.2				
	19	31 05.8	83 44.6 32.8	324 57.7 30.2	28 49.2 23.4	65 19.5 01.2	Zuben'ubi	136 58.0	S16 08.1				
	20	46 08.3	98 43.8 32.1	340 00.4 30.2	43 51.3 23.2	80 21.7 01.1							
	21	61 10.8	113 43.1 . . 31.4	355 03.1 . . 30.2	58 53.5 . . 23.1	95 23.9 . . 01.0							
	22	76 13.2	128 42.3 30.6	10 05.8 30.2	73 55.6 23.0	110 26.1 00.9	Venus	54 59.1	h 13 23				
	23	91 15.7	143 41.5 29.9	25 08.4 30.1	88 57.8 22.8	125 28.3 00.8	Mars	293 41.1	21 24				
	Mer. Pass. 16 59.9											Jupiter	357 56.3
											Saturn	34 24.6	14 43

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	4	5	6	7		
	°	'			°	'													°	'
d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m			
WEDNESDAY	4 00	178	51.1	S22	46.2	34	30.8	10.9	N24	30.6	6.6	54.8	N 72	08 20	10 30					
	01	193	50.8		45.9	49	00.7	10.8	24	37.2	6.5	54.7	N 70	08 02	09 43					
	02	208	50.5		45.7	63	30.5	10.8	24	43.7	6.4	54.7	68	07 47	09 12	11 31				
	03	223	50.2		45.4	78	00.3	10.7	24	50.1	6.3	54.7	66	07 35	08 50	10 20				
	04	238	49.9		45.1	92	30.0	10.7	24	56.4	6.1	54.7	64	07 25	08 32	09 45	10 52			
	05	253	49.7		44.9	106	59.7	10.6	25	02.5	6.0	54.7	62	07 16	08 17	09 20	11 49	12 00	12 46	14 14
	06	268	49.4	S22	44.6	121	29.3	10.7	N25	08.5	5.9	54.7	60	07 08	08 04	09 00	12 22	12 48	13 37	14 51
	07	283	49.1		44.4	135	59.0	10.6	25	14.4	5.7	54.7	N 58	07 01	07 53	08 44	12 47	13 18	14 09	15 17
	08	298	48.8		44.1	150	28.6	10.5	25	20.1	5.7	54.6	56	06 55	07 43	08 30	13 07	13 42	14 33	15 38
	09	313	48.5		43.9	164	58.1	10.5	25	25.8	5.5	54.6	54	06 49	07 35	08 18	13 23	14 01	14 52	15 55
	10	328	48.2		43.6	179	27.6	10.5	25	31.3	5.4	54.6	52	06 44	07 27	08 07	13 37	14 17	15 08	16 10
	11	343	48.0		43.3	193	57.1	10.4	25	36.7	5.2	54.6	50	06 39	07 20	07 58	13 50	14 30	15 22	16 23
	12	358	47.7	S22	43.1	208	26.5	10.4	N25	41.9	5.2	54.6	45	06 28	07 05	07 38	14 15	14 59	15 50	16 49
	13	13	47.4		42.8	222	55.9	10.4	25	47.1	5.0	54.6	N 40	06 18	06 52	07 22	14 36	15 21	16 12	17 10
	14	28	47.1		42.5	237	25.3	10.3	25	52.1	4.8	54.6	35	06 09	06 41	07 08	14 53	15 39	16 31	17 27
	15	43	46.8		42.3	251	54.6	10.3	25	56.9	4.8	54.5	30	06 01	06 30	06 57	15 08	15 55	16 47	17 42
	16	58	46.5		42.0	266	23.9	10.3	26	01.7	4.6	54.5	20	05 45	06 12	06 36	15 33	16 22	17 14	18 07
	17	73	46.3		41.7	280	53.2	10.3	26	06.3	4.5	54.5	N 10	05 29	05 56	06 18	15 55	16 45	17 37	18 28
	18	88	46.0	S22	41.5	295	22.5	10.2	N26	10.8	4.3	54.5	0	05 13	05 39	06 02	16 15	17 07	17 58	18 49
	19	103	45.7		41.2	309	51.7	10.2	26	15.1	4.3	54.5	S 10	04 55	05 22	05 45	16 36	17 28	18 20	19 09
	20	118	45.4		40.9	324	20.9	10.1	26	19.4	4.1	54.5	20	04 33	05 02	05 26	16 58	17 52	18 43	19 30
	21	133	45.1		40.7	338	50.0	10.2	26	23.5	3.9	54.5	30	04 05	04 38	05 05	17 24	18 19	19 10	19 55
	22	148	44.9		40.4	353	19.2	10.1	26	27.4	3.9	54.5	35	03 47	04 23	04 53	17 39	18 35	19 25	20 10
23	163	44.6		40.1	7	48.3	10.1	26	31.3	3.7	54.4	40	03 25	04 06	04 38	17 56	18 53	19 44	20 27	
THURSDAY	5 00	178	44.3	S22	39.9	22	17.4	10.0	N26	35.0	3.6	54.4	45	02 56	03 44	04 21	18 18	19 16	20 06	20 47
	01	193	44.0		39.6	36	46.4	10.1	26	38.6	3.4	54.4	S 50	02 13	03 16	03 59	18 45	19 45	20 34	21 12
	02	208	43.7		39.3	51	15.5	10.0	26	42.0	3.3	54.4	52	01 48	03 02	03 49	18 58	19 59	20 48	21 24
	03	223	43.5		39.0	65	44.5	10.0	26	45.3	3.2	54.4	54	01 12	02 45	03 37	19 13	20 15	21 04	21 38
	04	238	43.2		38.8	80	13.5	10.0	26	48.5	3.1	54.4	56	////	02 24	03 24	19 31	20 35	21 23	21 55
	05	253	42.9		38.5	94	42.5	9.9	26	51.6	2.9	54.4	58	////	01 58	03 08	19 53	20 59	21 46	22 14
	06	268	42.6	S22	38.2	109	11.4	10.0	N26	54.5	2.8	54.4	S 60	////	01 18	02 49	20 21	21 32	22 16	22 38
	07	283	42.3		37.9	123	40.4	9.9	26	57.3	2.6	54.4	Lat.		Sunset		Twilight		Moonset	
	08	298	42.1		37.6	138	09.3	9.9	26	59.9	2.5	54.3			Civil		Naut.		4	5
	09	313	41.8		37.4	152	38.2	9.9	27	02.4	2.4	54.3							6	7
	10	328	41.5		37.1	167	07.1	9.9	27	04.8	2.2	54.3							h m	h m
	11	343	41.2		36.8	181	36.0	9.9	27	07.0	2.2	54.3							h m	h m
	12	358	40.9	S22	36.5	196	04.9	9.9	N27	09.2	1.9	54.3	N 72		13 41	15 51				
	13	13	40.7		36.2	210	33.8	9.8	27	11.1	1.9	54.3	N 70		14 28	16 09				
	14	28	40.4		36.0	225	02.6	9.9	27	13.0	1.7	54.3	68	12 40	14 59	16 24				
	15	43	40.1		35.7	239	31.5	9.8	27	14.7	1.6	54.3	66	13 51	15 21	16 36				
	16	58	39.8		35.4	254	00.3	9.9	27	16.3	1.4	54.3	64	14 26	15 39	16 46	09 05			
	17	73	39.6		35.1	268	29.2	9.8	27	17.7	1.3	54.3	62	14 51	15 54	16 55	08 08	09 44	10 46	11 04
	18	88	39.3	S22	34.8	282	58.0	9.8	N27	19.0	1.2	54.2	60	15 11	16 07	17 03	07 36	08 56	09 54	10 26
	19	103	39.0		34.5	297	26.8	9.9	27	20.2	1.0	54.2	N 58	15 27	16 18	17 10	07 11	08 26	09 22	09 59
	20	118	38.7		34.2	311	55.7	9.8	27	21.2	0.9	54.2	56	15 41	16 27	17 16	06 52	08 03	08 59	09 38
	21	133	38.4		34.0	326	24.5	9.8	27	22.1	0.8	54.2	54	15 53	16 36	17 22	06 36	07 44	08 39	09 21
	22	148	38.2		33.7	340	53.3	9.9	27	22.9	0.6	54.2	52	16 03	16 44	17 27	06 22	07 28	08 23	09 06
23	163	37.9		33.4	355	22.2	9.8	27	23.5	0.5	54.2	50	16 13	16 51	17 32	06 10	07 14	08 09	08 53	
FRIDAY	6 00	178	37.6	S22	33.1	9	51.0	9.9	N27	24.0	0.4	54.2	45	16 33	17 06	17 43	05 45	06 46	07 41	08 26
	01	193	37.3		32.8	24	19.9	9.8	27	24.4	0.2	54.2	N 40	16 49	17 19	17 53	05 25	06 24	07 18	08 05
	02	208	37.1		32.5	38	48.7	9.9	27	24.6	0.1	54.2	35	17 02	17 30	18 02	05 08	06 06	07 00	07 47
	03	223	36.8		32.2	53	17.6	9.9	27	24.7	0.1	54.2	30	17 14	17 40	18 10	04 54	05 51	06 44	07 32
	04	238	36.5		31.9	67	46.5	9.8	27	24.6	0.2	54.2	20	17 34	17 58	18 26	04 30	05 24	06 17	07 06
	05	253	36.2		31.6	82	15.3	9.9	27	24.4	0.3	54.2	N 10	17 52	18 15	18 41	04 09	05 01	05 53	06 44
	06	268	36.0	S22	31.3	96	44.2	9.9	N27	24.1	0.4	54.1	0	18 09	18 31	18 57	03 49	04 40	05 32	06 23
	07	283	35.7		31.0	111	13.1	10.0	27	23.7	0.6	54.1	S 10	18 26	18 49	19 16	03 30	04 19	05 10	06 02
	08	298	35.4		30.7	125	42.1	9.9	27	23.1	0.7	54.1	20	18 44	19 08	19 37	03 09	03 56	04 47	05 39
	09	313	35.1		30.4	140	11.0	9.9	27	22.4	0.9	54.1	30	19 05	19 32	20 05	02 45	03 30	04 19	05 13
	10	328	34.9		30.1	154	39.9	10.0	27	21.5	0.9	54.1	35	19 18	19 47	20 23	02 31	03 14	04 03	04 57
	11	343	34.6		29.8	169	08.9	10.0	27	20.6	1.2	54.1	40	19 32	20 04	20 45	02 15	02 56	03 45	04 39
	12	358	34.3	S22	29.5	183	37.9	10.0	N27	19.4	1.2	54.1	45	19 49	20 26	21 14	01 55	02 35	03 22	04 17
	13	13	34.1		29.2	198	06.9	10.0	27	18.2	1.4	54.1	S 50	20 11	20 54	21 56	01 31	02 07	02 53	03 50
	14	28	33.8		28.9	212	35.9	10.0	27	16.8	1.5	54.1	52	20 21	21 08	22 21	01 20	01 54	02 39	03 36
	15	43	33.5		28.6	227	04.9	10.1	27	15.3	1.7	54.1	54	20 33	21 25	22 56	01 07	01 38	02 22	03 20
	16	58	33.2		28.3	241	34.0	10.1	27	13.6	1.7	54.1	56	20 46	21 45	////	00 52	01 20	02 03	03 02
	17	73	33.0		28.0	256	0													

UT	ARIES	VENUS	-3.9	MARS	-1.0	JUPITER	-2.3	SATURN	+0.8	STARS			
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
7 00 01 02 03	106 18.2	158 40.7	S20 29.2	40 11.1	N24 30.1	103 59.9	S 0 22.7	140 30.5	S15 00.7	Acamar	315 12.8	S40 13.0	
	121 20.6	173 39.9	28.5	55 13.8	30.1	119 02.1	22.5	155 32.7	00.7	Achernar	335 21.3	S57 07.5	
	136 23.1	188 39.1	27.7	70 16.5	30.0	134 04.3	22.4	170 34.9	00.6	Acruz	173 01.8	S63 13.3	
	151 25.6	203 38.4	27.0	85 19.1	30.0	149 06.4	22.2	185 37.1	00.5	Adhara	255 06.8	S29 00.2	
	166 28.0	218 37.6	26.3	100 21.8	30.0	164 08.6	22.1	200 39.4	00.4	Aldebaran	290 41.2	N16 33.3	
04 05 06	181 30.5	233 36.8	25.6	115 24.5	30.0	179 10.7	22.0	215 41.6	00.3				
SATURDAY	06 196 32.9	248 36.0	S20 24.8	130 27.1	N24 29.9	194 12.9	S 0 21.8	230 43.8	S15 00.2	Alioth	166 14.4	N55 49.8	
	07 211 35.4	263 35.2	24.1	145 29.8	29.9	209 15.0	21.7	245 46.0	00.1	Alkaid	152 53.4	N49 11.7	
	08 226 37.9	278 34.5	23.4	160 32.5	29.9	224 17.2	21.5	260 48.2	00.0	Alnair	27 35.3	S46 51.2	
	09 241 40.3	293 33.7	22.6	175 35.1	29.9	239 19.3	21.4	275 50.4	15 00.0	Alnilam	275 39.1	S 1 11.3	
	10 256 42.8	308 32.9	21.9	190 37.8	29.8	254 21.5	21.2	290 52.6	14 59.9	Alphard	217 49.1	S 8 45.5	
	11 271 45.3	323 32.1	21.2	205 40.4	29.8	269 23.6	21.1	305 54.8	59.8				
	12 286 47.7	338 31.3	S20 20.4	220 43.1	N24 29.8	284 25.8	S 0 20.9	320 57.0	S14 59.7	Alphecca	126 05.4	N26 38.1	
	13 301 50.2	353 30.6	19.7	235 45.8	29.8	299 27.9	20.8	335 59.2	59.6	Alpheratz	357 36.6	N29 13.1	
	14 316 52.7	8 29.8	19.0	250 48.4	29.7	314 30.1	20.6	351 01.4	59.5	Altair	62 01.9	N 8 55.7	
	15 331 55.1	23 29.0	18.2	265 51.1	29.7	329 32.3	20.5	6 03.6	59.4	Ankaa	353 08.9	S42 11.2	
SUNDAY	16 346 57.6	38 28.2	17.5	280 53.7	29.7	344 34.4	20.4	21 05.8	59.4	Antares	112 18.2	S26 28.9	
	17 2 00.1	53 27.5	16.7	295 56.4	29.7	359 36.6	20.2	36 08.0	59.3				
	18 17 02.5	68 26.7	S20 16.0	310 59.0	N24 29.6	14 38.7	S 0 20.1	51 10.3	S14 59.2	Arcturus	145 49.5	N19 03.7	
	19 32 05.0	83 25.9	15.3	326 01.7	29.6	29 40.9	19.9	66 12.5	59.1	Atria	107 14.4	S69 03.9	
	20 47 07.4	98 25.1	14.5	341 04.3	29.6	44 43.0	19.8	81 14.7	59.0	Avior	234 14.8	S59 34.8	
	21 62 09.9	113 24.4	13.8	356 07.0	29.6	59 45.2	19.6	96 16.9	58.9	Bellatrix	278 24.3	N 6 22.2	
	22 77 12.4	128 23.6	13.0	11 09.6	29.5	74 47.3	19.5	111 19.1	58.8	Betelgeuse	270 53.5	N 7 24.6	
	23 92 14.8	143 22.8	12.3	26 12.2	29.5	89 49.5	19.3	126 21.3	58.7				
	MONDAY	00 107 17.3	158 22.1	S20 11.5	41 14.9	N24 29.5	104 51.6	S 0 19.2	141 23.5	S14 58.7	Canopus	263 52.6	S52 42.5
		01 122 19.8	173 21.3	10.8	56 17.5	29.5	119 53.8	19.0	156 25.7	58.6	Capella	280 23.9	N46 01.3
02 137 22.2		188 20.5	10.0	71 20.1	29.4	134 55.9	18.9	171 27.9	58.5	Deneb	49 27.4	N45 21.8	
03 152 24.7		203 19.7	09.3	86 22.8	29.4	149 58.1	18.7	186 30.1	58.4	Denebola	182 26.5	N14 26.5	
04 167 27.2		218 19.0	08.5	101 25.4	29.4	165 00.2	18.6	201 32.3	58.3	Diphda	348 49.0	S17 51.8	
05 182 29.6		233 18.2	07.8	116 28.0	29.4	180 02.4	18.5	216 34.5	58.2				
06 197 32.1		248 17.4	S20 07.0	131 30.7	N24 29.4	195 04.5	S 0 18.3	231 36.7	S14 58.1	Dubhe	193 42.7	N61 37.4	
07 212 34.5		263 16.7	06.3	146 33.3	29.3	210 06.7	18.2	246 38.9	58.0	Elnath	278 03.6	N28 37.6	
08 227 37.0		278 15.9	05.5	161 35.9	29.3	225 08.8	18.0	261 41.1	58.0	Eltanin	90 43.5	N51 29.0	
09 242 39.5		293 15.1	04.8	176 38.6	29.3	240 11.0	17.9	276 43.3	57.9	Enif	33 40.7	N 9 58.8	
TUESDAY	10 257 41.9	308 14.4	04.0	191 41.2	29.3	255 13.1	17.7	291 45.6	57.8	Fomalhaut	15 16.5	S29 30.3	
	11 272 44.4	323 13.6	03.3	206 43.8	29.2	270 15.3	17.6	306 47.8	57.7				
	12 287 46.9	338 12.8	S20 02.5	221 46.4	N24 29.2	285 17.4	S 0 17.4	321 50.0	S14 57.6	Gacrux	171 53.4	S57 14.2	
	13 302 49.3	353 12.1	01.7	236 49.0	29.2	300 19.6	17.3	336 52.2	57.5	Gienah	175 45.2	S17 40.1	
	14 317 51.8	8 11.3	01.0	251 51.7	29.2	315 21.7	17.1	351 54.4	57.4	Hadar	148 38.5	S60 28.7	
	15 332 54.3	23 10.6	20 00.2	266 54.3	29.2	330 23.8	17.0	6 56.6	57.3	Hamal	327 53.0	N23 34.3	
	16 347 56.7	38 09.8	19 59.4	281 56.9	29.1	345 26.0	16.8	21 58.8	57.3	Kaus Aust.	83 35.1	S34 22.4	
	17 2 59.2	53 09.0	58.7	296 59.5	29.1	0 28.1	16.7	37 01.0	57.2				
	18 18 01.7	68 08.3	S19 57.9	312 02.1	N24 29.1	15 30.3	S 0 16.5	52 03.2	S14 57.1	Kochab	137 20.3	N74 03.3	
	19 33 04.1	83 07.5	57.2	327 04.7	29.1	30 32.4	16.4	67 05.4	57.0	Markab	13 31.7	N15 19.7	
WEDNESDAY	20 48 06.6	98 06.8	56.4	342 07.3	29.1	45 34.6	16.2	82 07.6	56.9	Menkar	314 07.7	N 4 10.7	
	21 63 09.0	113 06.0	55.6	357 09.9	29.0	60 36.7	16.1	97 09.8	56.8	MerKent	147 59.7	S36 28.8	
	22 78 11.5	128 05.2	54.8	12 12.5	29.0	75 38.9	15.9	112 12.0	56.7	Miaplacidus	221 37.8	S69 48.5	
	23 93 14.0	143 04.5	54.1	27 15.1	29.0	90 41.0	15.8	127 14.2	56.6				
	THURSDAY	00 108 16.4	158 03.7	S19 53.3	42 17.7	N24 29.0	105 43.2	S 0 15.6	142 16.4	S14 56.6	Mirfak	308 30.3	N49 56.7
		01 123 18.9	173 03.0	52.5	57 20.3	29.0	120 45.3	15.5	157 18.6	56.5	Nunki	75 50.2	S26 16.1
		02 138 21.4	188 02.2	51.8	72 22.9	28.9	135 47.5	15.3	172 20.8	56.4	Peacock	53 08.9	S56 39.8
		03 153 23.8	203 01.4	51.0	87 25.5	28.9	150 49.6	15.2	187 23.0	56.3	Pollux	243 19.0	N27 58.2
		04 168 26.3	218 00.7	50.2	102 28.1	28.9	165 51.7	15.0	202 25.2	56.2	Procyon	244 52.2	N 5 09.9
		05 183 28.8	232 59.9	49.4	117 30.7	28.9	180 53.9	14.9	217 27.4	56.1			
06 198 31.2		247 59.2	S19 48.7	132 33.3	N24 28.9	195 56.0	S 0 14.8	232 29.6	S14 56.0	Rasalhague	96 00.4	N12 32.5	
07 213 33.7		262 58.4	47.9	147 35.9	28.8	210 58.2	14.6	247 31.9	55.9	Regulus	207 36.0	N11 51.2	
08 228 36.2		277 57.7	47.1	162 38.5	28.8	226 00.3	14.5	262 34.1	55.9	Rigel	281 05.1	S 8 10.6	
09 243 38.6		292 56.9	46.3	177 41.1	28.8	241 02.5	14.3	277 36.3	55.8	Rigel Kent.	139 42.8	S60 55.5	
FRIDAY	10 258 41.1	307 56.2	45.5	192 43.7	28.8	256 04.6	14.2	292 38.5	55.7	Sabik	102 05.0	S15 45.2	
	11 273 43.5	322 55.4	44.8	207 46.3	28.8	271 06.7	14.0	307 40.7	55.6				
	12 288 46.0	337 54.7	S19 44.0	222 48.9	N24 28.7	286 08.9	S 0 13.9	322 42.9	S14 55.5	Schedar	349 33.0	N56 40.0	
	13 303 48.5	352 53.9	43.2	237 51.4	28.7	301 11.0	13.7	337 45.1	55.4	Shaula	96 13.0	S37 07.2	
	14 318 50.9	7 53.2	42.4	252 54.0	28.7	316 13.2	13.6	352 47.3	55.3	Sirius	258 27.3	S16 44.9	
	15 333 53.4	22 52.4	41.6	267 56.6	28.7	331 15.3	13.4	7 49.5	55.2	Spica	158 24.1	S11 16.8	
	16 348 55.9	37 51.7	40.8	282 59.2	28.7	346 17.5	13.3	22 51.7	55.1	Suhail	222 47.1	S43 31.4	
	17 3 58.3	52 50.9	40.0	298 01.8	28.7	1 19.6	13.1	37 53.9	55.1				
	18 19 00.8	67 50.2	S19 39.3	313 04.3	N24 28.6	16 21.7	S 0 13.0	52 56.1	S14 55.0	Vega	80 34.8	N38 48.2	
	19 34 03.3	82 49.4	38.5	328 06.9	28.6	31 23.9	12.8	67 58.3	54.9	Zuben'ubi	136 58.0	S16 08.1	
SATURDAY	20 49 05.7	97 48.7	37.7	343 09.5	28.6	46 26.0	12.7	83 00.5	54.8				
	21 64 08.2	112 47.9	36.9	358 12.0	28.6	61 28.2	12.5	98 02.7	54.7		SHA	Mer.Pass.	
	22 79 10.7	127 47.2	36.1	13 14.6	28.6	76 30.3	12.3	113 04.9	54.6	Venus	51 04.8	h 13 27	
	23 94 13.1	142 46.4	35.3	28 17.2	28.6	91 32.4	12.2	128 07.1	54.5	Mars	293 57.6	21 11	
										Jupiter	357 34.3	16 58	
										Saturn	34 06.2	14 32	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	7	8	9	10
	°	'		°	'												
SATURDAY	^{d h} 7 00	178 31.1	S22 25.9	357 27.5	10.4	N26 55.7	2.8	54.0	N 72	08 15	10 20					17 06	
	01	193 30.8	25.6	11 56.9	10.3	26 52.9	2.9	54.0	68	07 58	09 37					17 45	
	02	208 30.5	25.3	26 26.2	10.4	26 50.0	3.1	54.0	66	07 44	09 08	11 10			15 59	18 11	
	03	223 30.3	25.0	40 55.6	10.5	26 46.9	3.2	54.0	64	07 33	08 46	10 13		14 10	16 39	18 31	
	04	238 30.0	24.6	55 25.1	10.4	26 43.7	3.3	54.0	62	07 23	08 29	09 40		15 17	17 07	18 47	
	05	253 29.7	24.3	69 54.5	10.5	26 40.4	3.5	54.0	60	07 14	08 14	09 16	14 14	15 52	17 28	19 00	
	06	268 29.4	S22 24.0	84 24.0	10.6	N26 36.9	3.6	54.0	N 58	07 07	08 02	08 57	14 51	16 17	17 45	19 12	
	07	283 29.2	23.7	98 53.6	10.6	26 33.3	3.7	54.0	56	07 00	07 51	08 41	15 17	16 37	17 59	19 21	
	08	298 28.9	23.4	113 23.2	10.6	26 29.6	3.8	54.0	54	06 54	07 42	08 28	15 38	16 53	18 11	19 30	
	09	313 28.6	23.1	127 52.8	10.7	26 25.8	4.0	54.0	52	06 48	07 34	08 16	15 55	17 07	18 22	19 37	
	10	328 28.4	22.8	142 22.5	10.7	26 21.8	4.1	54.0	50	06 43	07 26	08 06	16 10	17 19	18 31	19 44	
	11	343 28.1	22.4	156 52.2	10.8	26 17.7	4.2	54.0	45	06 38	07 19	07 57	16 23	17 30	18 40	19 50	
	12	358 27.8	S22 22.1	171 22.0	10.8	N26 13.5	4.3	54.0	N 40	06 28	07 04	07 38	16 49	17 52	18 57	20 03	
	13	13 27.6	21.8	185 51.8	10.8	26 09.2	4.5	54.0	35	06 18	06 52	07 22	17 10	18 10	19 12	20 13	
	14	28 27.3	21.5	200 21.6	10.9	26 04.7	4.6	54.0	30	06 09	06 41	07 09	17 27	18 25	19 24	20 22	
	15	43 27.0	21.2	214 51.5	10.9	26 00.1	4.7	54.0	20	06 01	06 31	06 57	17 42	18 38	19 34	20 30	
	16	58 26.8	20.8	229 21.4	11.0	25 55.4	4.8	54.0	N 10	05 46	06 13	06 37	18 07	19 00	19 52	20 43	
	17	73 26.5	20.5	243 51.4	11.1	25 50.6	4.9	54.0	0	05 31	05 57	06 19	18 28	19 19	20 08	20 55	
	18	88 26.2	S22 20.2	258 21.5	11.1	N25 45.7	5.1	54.0	S 10	05 15	05 41	06 03	18 49	19 37	20 23	21 06	
	19	103 26.0	19.9	272 51.6	11.1	25 40.6	5.2	54.0	20	04 57	05 23	05 46	19 09	19 55	20 37	21 17	
	20	118 25.7	19.5	287 21.7	11.2	25 35.4	5.3	54.0	30	04 35	05 04	05 28	19 30	20 13	20 53	21 29	
	21	133 25.4	19.2	301 51.9	11.2	25 30.1	5.4	54.0	35	04 07	04 40	05 07	19 55	20 35	21 11	21 42	
	22	148 25.2	18.9	316 22.1	11.3	25 24.7	5.5	54.0	40	03 50	04 26	04 55	20 10	20 48	21 21	21 50	
	23	163 24.9	18.6	330 52.4	11.4	25 19.2	5.6	54.0	45	03 28	04 09	04 41	20 27	21 02	21 33	21 58	
SUNDAY	8 00	178 24.6	S22 18.2	345 22.8	11.4	N25 13.6	5.8	54.0	S 50	02 19	03 20	04 03	21 12	21 41	22 03	22 21	
	01	193 24.4	17.9	359 53.2	11.4	25 07.8	5.9	54.0	52	01 55	03 06	03 53	21 24	21 51	22 11	22 26	
	02	208 24.1	17.6	14 23.6	11.5	25 01.9	6.0	54.0	54	01 22	02 50	03 42	21 38	22 02	22 19	22 32	
	03	223 23.8	17.3	28 54.1	11.6	24 55.9	6.1	54.0	56	///	02 30	03 29	21 55	22 15	22 29	22 39	
	04	238 23.6	16.9	43 24.7	11.6	24 49.8	6.2	53.9	58	///	02 05	03 13	22 14	22 30	22 40	22 47	
	05	253 23.3	16.6	57 55.3	11.7	24 43.6	6.3	53.9	S 60	///	01 29	02 55	22 38	22 48	22 53	22 55	
	06	268 23.0	S22 16.3	72 26.0	11.7	N24 37.3	6.5	53.9		Lat.	Sunset	Twilight		Moonset			
	07	283 22.8	15.9	86 56.7	11.8	24 30.8	6.5	53.9				Civil	Naut.	7	8	9	10
	08	298 22.5	15.6	101 27.5	11.8	24 24.3	6.7	53.9									
	09	313 22.2	15.3	115 58.3	11.9	24 17.6	6.7	53.9									
	10	328 22.0	14.9	130 29.2	12.0	24 10.9	6.9	53.9									
	11	343 21.7	14.6	145 00.2	12.0	24 04.0	7.0	53.9	N 72		13 54	15 59					13 06
	12	358 21.4	S22 14.3	159 31.2	12.1	N23 57.0	7.1	53.9	N 70		14 37	16 16					12 26
	13	13 21.2	13.9	174 02.3	12.1	23 49.7	7.2	53.9	68	13 03	15 06	16 30			12 38	11 57	
	14	28 20.9	13.6	188 33.4	12.2	23 42.7	7.3	53.9	66	14 00	15 28	16 41		12 49	11 57	11 36	
	15	43 20.7	13.2	203 04.6	12.2	23 35.4	7.4	53.9	64	14 33	15 45	16 51		11 42	11 28	11 19	
	16	58 20.4	12.9	217 35.8	12.3	23 28.0	7.5	54.0	62	14 57	15 59	16 59	11 04	11 07	11 07	11 05	
	17	73 20.1	12.6	232 07.1	12.4	23 20.5	7.6	54.0	60	15 16	16 11	17 07	10 26	10 41	10 49	10 53	
	18	88 19.9	S22 12.2	246 38.5	12.4	N23 12.9	7.7	54.0	N 58	15 32	16 22	17 14	09 59	10 21	10 34	10 42	
	19	103 19.6	11.9	261 09.9	12.5	23 05.2	7.8	54.0	56	15 46	16 31	17 20	09 38	10 04	10 21	10 33	
	20	118 19.3	11.5	275 41.4	12.6	22 57.4	7.9	54.0	54	15 57	16 40	17 25	09 21	09 50	10 10	10 25	
	21	133 19.1	11.2	290 13.0	12.6	22 49.5	8.1	54.0	52	16 07	16 47	17 30	09 06	09 37	10 00	10 18	
	22	148 18.8	10.8	304 44.6	12.6	22 41.4	8.1	54.0	50	16 17	16 54	17 35	08 53	09 26	09 51	10 11	
	23	163 18.6	10.5	319 16.2	12.8	22 33.3	8.2	54.0	45	16 36	17 09	17 46	08 26	09 03	09 32	09 57	
MONDAY	9 00	178 18.3	S22 10.2	333 48.0	12.8	N22 25.1	8.3	54.0	N 40	16 51	17 22	17 55	08 05	08 44	09 17	09 45	
	01	193 18.0	09.8	348 19.8	12.8	22 16.8	8.4	54.0	35	17 05	17 33	18 04	07 47	08 29	09 04	09 35	
	02	208 17.8	09.5	2 51.6	12.9	22 08.4	8.5	54.0	30	17 16	17 42	18 12	07 32	08 15	08 52	09 26	
	03	223 17.5	09.1	17 23.5	13.0	21 59.9	8.6	54.0	20	17 36	18 00	18 27	07 06	07 52	08 33	09 10	
	04	238 17.3	08.8	31 55.5	13.0	21 51.3	8.7	54.0	N 10	17 54	18 16	18 43	06 44	07 31	08 16	08 57	
	05	253 17.0	08.4	46 27.5	13.1	21 42.6	8.8	54.0	0	18 10	18 33	18 59	06 23	07 12	07 59	08 44	
	06	268 16.7	S22 08.1	60 59.6	13.2	N21 33.8	8.9	54.0	S 10	18 27	18 50	19 17	06 02	06 53	07 43	08 31	
	07	283 16.5	07.7	75 31.8	13.2	21 24.9	8.9	54.0	20	18 45	19 09	19 38	05 39	06 33	07 26	08 17	
	08	298 16.2	07.4	90 04.0	13.2	21 16.0	9.1	54.0	30	19 05	19 33	20 05	05 13	06 09	07 05	08 01	
	09	313 16.0	07.0	104 36.2	13.4	21 06.9	9.1	54.0	35	19 18	19 47	20 23	04 57	05 55	06 53	07 52	
	10	328 15.7	06.7	119 08.6	13.4	20 57.8	9.3	54.0	40	19 32	20 04	20 44	04 39	05 38	06 40	07 41	
	11	343 15.5	06.3	133 41.0	13.4	20 48.5	9.3	54.0	45	19 49	20 25	21 13	04 17	05 19	06 23	07 29	
	12	358 15.2	S22 06.0	148 13.4	13.5	N20 39.2	9.4	54.0	S 50	20 10	20 52	21 53	03 50	04 54	06 03	07 13	
	13	13 14.9	05.6	162 45.9	13.6	20 29.8	9.5	54.0	52	20 20	21 06	22 16	03 36	04 42	05 53	07 06	
	14	28 14.7	05.2	177 18.5	13.6	20 20.3	9.6	54.0	54	20 31	21 22	22 49	03 20	04 29	05 43	06 58	
	15	43 14.4	04.9	191 51.1	13.7	20 10.7	9.7	54.0	56	20 44	21 42	///	03 02	04 13	05 30	06 49	
	16	58 14.2	04.5	206 23.8	13.7	20 01.0	9.7	54.0	58	20 59	22 06	///	02 39	03 54	05 16	06 39	
	17	73 13.9	04.2	220 56.5	13.8	19 51.3	9.9	54.0	S 60	21 17	22 42	///	02 08	03 30	04 59	06 27	
	18	88 13.7	S22 03.8	235 29.3	13.9	N19 41.4	9.9	54.0		SUN		MOON					
	19	103 13.4	03.4	250 02.2	13.9	19 31.5	10.0	54.0		Day	Eqn. of Time	Mer.	Mer. Pass.		Age	Phase	
	20	118 13.1	03.1	264 35.1	14.0	19 21.5	10.1	54.0									
	21	133 12.9	02.7	279 08.													

UT	ARIES		VENUS −3.9		MARS −0.9		JUPITER −2.3		SATURN +0.8		STARS								
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA	Dec									
TUESDAY	10 00	109 15.6	157 45.7 S19	34.5	43 19.7 N24	28.5	106 34.6 S 0	12.0	143 09.3 S14	54.4	Acamar	315 12.8 S40	13.0						
	01	124 18.0	172 45.0	33.7	58 22.3	28.5	121 36.7	11.9	158 11.5	54.4	Achernar	335 21.4 S57	07.6						
	02	139 20.5	187 44.2	32.9	73 24.9	28.5	136 38.9	11.7	173 13.7	54.3	Acrux	173 01.7 S63	13.3						
	03	154 23.0	202 43.5	32.1	88 27.4	28.5	151 41.0	11.6	188 15.9	54.2	Adhara	255 06.8 S29	00.2						
	04	169 25.4	217 42.7	31.3	103 30.0	28.5	166 43.1	11.4	203 18.1	54.1	Aldebaran	290 41.2 N16	33.3						
	05	184 27.9	232 42.0	30.5	118 32.6	28.5	181 45.3	11.3	218 20.3	54.0									
	06	199 30.4	247 41.3 S19	29.7	133 35.1 N24	28.4	196 47.4 S 0	11.1	233 22.5 S14	53.9	Alioth	166 14.4 N55	49.8						
	07	214 32.8	262 40.5	28.9	148 37.7	28.4	211 49.5	11.0	248 24.7	53.8	Alkaid	152 53.4 N49	11.7						
	08	229 35.3	277 39.8	28.1	163 40.2	28.4	226 51.7	10.8	263 26.9	53.7	Alnair	27 35.3 S46	51.2						
	09	244 37.8	292 39.0	27.3	178 42.8	28.4	241 53.8	10.7	278 29.1	53.6	Alnilam	275 39.1 S 1	11.3						
	10	259 40.2	307 38.3	26.5	193 45.3	28.4	256 56.0	10.5	293 31.3	53.6	Alphard	217 49.1 S 8	45.5						
	11	274 42.7	322 37.6	25.7	208 47.9	28.4	271 58.1	10.4	308 33.5	53.5									
	12	289 45.1	337 36.8 S19	24.9	223 50.4 N24	28.4	287 00.2 S 0	10.2	323 35.7 S14	53.4	Alphecca	126 05.4 N26	38.1						
	13	304 47.6	352 36.1	24.1	238 53.0	28.3	302 02.4	10.1	338 37.9	53.3	Alpheratz	357 36.6 N29	13.1						
	14	319 50.1	7 35.3	23.3	253 55.5	28.3	317 04.5	09.9	353 40.1	53.2	Altair	62 01.9 N 8	55.7						
	15	334 52.5	22 34.6	22.5	268 58.1	28.3	332 06.6	09.8	8 42.3	53.1	Ankaa	353 08.9 S42	11.2						
	16	349 55.0	37 33.9	21.6	284 00.6	28.3	347 08.8	09.6	23 44.5	53.0	Antares	112 18.1 S26	28.9						
	17	4 57.5	52 33.1	20.8	299 03.1	28.3	2 10.9	09.5	38 46.7	52.9									
	18	19 59.9	67 32.4 S19	20.0	314 05.7 N24	28.3	17 13.0 S 0	09.3	53 48.9 S14	52.8	Arcturus	145 49.5 N19	03.6						
	19	35 02.4	82 31.7	19.2	329 08.2	28.3	32 15.2	09.2	68 51.1	52.8	Atria	107 14.3 S69	03.9						
	20	50 04.9	97 30.9	18.4	344 10.7	28.2	47 17.3	09.0	83 53.3	52.7	Avior	234 14.8 S59	34.9						
	21	65 07.3	112 30.2	17.6	359 13.3	28.2	62 19.4	08.9	98 55.5	52.6	Bellatrix	278 24.3 N 6	22.2						
	22	80 09.8	127 29.5	16.8	14 15.8	28.2	77 21.6	08.7	113 57.8	52.5	Betelgeuse	270 53.5 N 7	24.6						
	23	95 12.3	142 28.7	15.9	29 18.3	28.2	92 23.7	08.6	129 00.0	52.4									
	WEDNESDAY	11 00	110 14.7	157 28.0 S19	15.1	44 20.9 N24	28.2	107 25.9 S 0	08.4	144 02.2 S14	52.3	Canopus	263 52.6 S52	42.5					
01		125 17.2	172 27.3	14.3	59 23.4	28.2	122 28.0	08.2	159 04.4	52.2	Capella	280 23.9 N46	01.3						
02		140 19.6	187 26.6	13.5	74 25.9	28.2	137 30.1	08.1	174 06.6	52.1	Deneb	49 27.4 N45	21.7						
03		155 22.1	202 25.8	12.7	89 28.5	28.2	152 32.3	07.9	189 08.8	52.0	Denebola	182 26.5 N14	26.5						
04		170 24.6	217 25.1	11.8	104 31.0	28.1	167 34.4	07.8	204 11.0	52.0	Diphda	348 49.0 S17	51.8						
05		185 27.0	232 24.4	11.0	119 33.5	28.1	182 36.5	07.6	219 13.2	51.9									
06		200 29.5	247 23.6 S19	10.2	134 36.0 N24	28.1	197 38.7 S 0	07.5	234 15.4 S14	51.8	Dubhe	193 42.6 N61	37.4						
07		215 32.0	262 22.9	09.4	149 38.5	28.1	212 40.8	07.3	249 17.6	51.7	Elnath	278 03.6 N28	37.6						
08		230 34.4	277 22.2	08.6	164 41.1	28.1	227 42.9	07.2	264 19.8	51.6	Eltanin	90 43.5 N51	29.0						
09		245 36.9	292 21.5	07.7	179 43.6	28.1	242 45.0	07.0	279 22.0	51.5	Enif	33 40.7 N 9	58.8						
10		260 39.4	307 20.7	06.9	194 46.1	28.1	257 47.2	06.9	294 24.2	51.4	Fomalhaut	15 16.6 S29	30.3						
11		275 41.8	322 20.0	06.1	209 48.6	28.1	272 49.3	06.7	309 26.4	51.3									
12		290 44.3	337 19.3 S19	05.2	224 51.1 N24	28.0	287 51.4 S 0	06.6	324 28.6 S14	51.2	Gacrux	171 53.3 S57	14.2						
13		305 46.8	352 18.6	04.4	239 53.6	28.0	302 53.6	06.4	339 30.8	51.1	Gienah	175 45.2 S17	40.1						
14		320 49.2	7 17.9	03.6	254 56.1	28.0	317 55.7	06.2	354 33.0	51.1	Hadar	148 38.5 S60	28.7						
15		335 51.7	22 17.1	02.7	269 58.6	28.0	332 57.8	06.1	9 35.2	51.0	Hamal	327 53.0 N23	34.3						
16		350 54.1	37 16.4	01.9	285 01.2	28.0	348 00.0	05.9	24 37.4	50.9	Kaus Aust.	83 35.1 S34	22.4						
17		5 56.6	52 15.7	01.1	300 03.7	28.0	3 02.1	05.8	39 39.6	50.8									
18		20 59.1	67 15.0 S19	00.2	315 06.2 N24	28.0	18 04.2 S 0	05.6	54 41.8 S14	50.7	Kochab	137 20.3 N74	03.3						
19		36 01.5	82 14.2	18 59.4	330 08.7	28.0	33 06.4	05.5	69 44.0	50.6	Markab	13 31.7 N15	19.7						
20		51 04.0	97 13.5	58.6	345 11.2	28.0	48 08.5	05.3	84 46.2	50.5	Menkar	314 07.7 N 4	10.7						
21		66 06.5	112 12.8	57.7	0 13.7	28.0	63 10.6	05.2	99 48.4	50.4	Menkent	147 59.7 S36	28.8						
22		81 08.9	127 12.1	56.9	15 16.2	27.9	78 12.7	05.0	114 50.6	50.3	Miaplacidus	221 37.7 S69	48.5						
23		96 11.4	142 11.4	56.1	30 18.7	27.9	93 14.9	04.8	129 52.8	50.3									
THURSDAY		12 00	111 13.9	157 10.7 S18	55.2	45 21.1 N24	27.9	108 17.0 S 0	04.7	144 55.0 S14	50.2	Mirfak	308 30.3 N49	56.7					
	01	126 16.3	172 09.9	54.4	60 23.6	27.9	123 19.1	04.5	159 57.2	50.1	Nunki	75 50.2 S26	16.1						
	02	141 18.8	187 09.2	53.5	75 26.1	27.9	138 21.3	04.4	174 59.4	50.0	Peacock	53 08.9 S56	39.8						
	03	156 21.2	202 08.5	52.7	90 28.6	27.9	153 23.4	04.2	190 01.6	49.9	Pollux	243 18.9 N27	58.2						
	04	171 23.7	217 07.8	51.8	105 31.1	27.9	168 25.5	04.1	205 03.8	49.8	Procyon	244 52.2 N 5	09.9						
	05	186 26.2	232 07.1	51.0	120 33.6	27.9	183 27.6	03.9	220 06.0	49.7									
	06	201 28.6	247 06.4 S18	50.2	135 36.1 N24	27.9	198 29.8 S 0	03.8	235 08.2 S14	49.6	Rasalhague	96 00.4 N12	32.5						
	07	216 31.1	262 05.7	49.3	150 38.6	27.9	213 31.9	03.6	250 10.3	49.5	Regulus	207 35.9 N11	51.2						
	08	231 33.6	277 04.9	48.5	165 41.1	27.9	228 34.0	03.4	265 12.5	49.4	Rigel	281 05.2 S 8	10.6						
	09	246 36.0	292 04.2	47.6	180 43.5	27.9	243 36.1	03.3	280 14.7	49.4	Rigil Kent.	139 42.8 S60	55.5						
	10	261 38.5	307 03.5	46.8	195 46.0	27.8	258 38.3	03.1	295 16.9	49.3	Sabik	102 05.0 S15	45.2						
	11	276 41.0	322 02.8	45.9	210 48.5	27.8	273 40.4	03.0	310 19.1	49.2									
	12	291 43.4	337 02.1 S18	45.1	225 51.0 N24	27.8	288 42.5 S 0	02.8	325 21.3 S14	49.1	Schedar	349 33.0 N56	40.0						
	13	306 45.9	352 01.4	44.2	240 53.4	27.8	303 44.7	02.7	340 23.5	49.0	Shaula	96 13.0 S37	07.2						
	14	321 48.4	7 00.7	43.3	255 55.9	27.8	318 46.8	02.5	355 25.7	48.9	Sirius	258 27.3 S16	44.9						
	15	336 50.8	22 00.0	42.5	270 58.4	27.8	333 48.9	02.4	10 27.9	48.8	Spica	158 24.0 S11	16.8						
	16	351 53.3	36 59.3	41.6	286 00.9	27.8	348 51.0	02.2	25 30.1	48.7	Suhail	222 47.1 S43	31.4						
	17	6 55.7	51 58.6	40.8	301 03.3	27.8	3 53.2	02.0	40 32.3	48.6									
	18	21 58.2	66 57.9 S18	39.9	316 05.8 N24	27.8	18 55.3 S 0	01.9	55 34.5 S14	48.5	Vega	80 34.8 N38	48.2						
	19	37 00.7	81 57.1	39.1	331 08.3	27.8	33 57.4	01.7	70 36.7	48.5	Zuben'ubi	136 58.0 S16	08.2						
	20	52 03.1	96 56.4	38.2	346 10.7	27.8	48 59.5	01.6	85 38.9	48.4									
	21	67 05.6	111 55.7	37.3	1 13.2	27.8	64 01.7	01.4	100 41.1	48.3									
	22	82 08.1	126 55.0	36.5	16 15.7	27.8	79 03.8	01.3	115 43.3	48.2	Venus	47 13.3 S13	31						
	23	97 10.5	141 54.3	35.6	31 18.1	27.8	94 05.9	01.1	130 45.5	48.1	Mars	294 06.2 S20	59						
											Jupiter	357 11.1 S16	48						
										Saturn	33 47.4 S14	22							
Mer. Pass. 16 36.3																			
v −0.7 d 0.8																			
v 2.5 d 0.0																			
v 2.1 d 0.2																			
v 2.2 d 0.1																			

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise																
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	10	11	12	13											
d	h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m										
TUESDAY	10	00	178	12.1	S22	01.6	322	47.3	14.2	N18	40.7	10.4	54.1	N	72	08	10	10	08	17	06	19	32	21	36	23	35		
	01	193	11.9		01.3	337	20.5	14.2	18	30.3	10.5	54.1	N	70	07	54	09	29	10	54	17	45	19	49	21	42	23	32	
	02	208	11.6		00.9	351	53.7	14.3	18	19.8	10.6	54.1	68	07	40	09	02	10	54	18	11	20	02	21	47	23	30		
	03	223	11.4		00.5	6	27.0	14.4	18	09.2	10.6	54.1	66	07	29	08	42	10	05	18	31	20	13	21	51	23	28		
	04	238	11.1	22	00.2	21	00.4	14.4	17	58.6	10.7	54.1	64	07	20	08	25	09	35	18	47	20	22	21	54	23	26		
	05	253	10.8	21	59.8	35	33.8	14.4	17	47.9	10.8	54.1	62	07	12	08	11	09	12	19	00	20	30	21	57	23	25		
	06	268	10.6	S21	59.4	50	07.2	14.6	N17	37.1	10.8	54.1	60	07	05	07	59	08	54	19	12	20	36	22	00	23	24		
	07	283	10.3		59.1	64	40.8	14.5	17	26.3	11.0	54.1	N	58	06	52	07	40	08	26	19	30	20	47	22	04	23	22	
	08	298	10.1		58.7	79	14.3	14.6	17	15.3	10.9	54.1	54	06	47	07	32	08	14	19	37	20	52	22	06	23	21		
	09	313	09.8		58.3	93	47.9	14.7	17	04.4	11.1	54.1	52	06	42	07	25	08	04	19	44	20	56	22	07	23	20		
	10	328	09.6		58.0	108	21.6	14.7	16	53.3	11.2	54.2	50	06	37	07	18	07	55	19	50	20	59	22	09	23	19		
	11	343	09.3		57.6	122	55.3	14.8	16	42.1	11.2	54.2	45	06	27	07	04	07	37	20	03	21	07	22	12	23	18		
	12	358	09.1	S21	57.2	137	29.1	14.8	N16	30.9	11.2	54.2	N	40	06	18	06	51	07	21	20	13	21	14	22	15	23	17	
	13	13	08.8		56.8	152	02.9	14.8	16	19.7	11.4	54.2	35	06	09	06	41	07	08	20	22	21	20	22	17	23	15		
	14	28	08.6		56.5	166	36.7	15.0	16	08.3	11.4	54.2	30	06	01	06	31	06	57	20	30	21	25	22	19	23	14		
	15	43	08.3		56.1	181	10.7	14.9	15	56.9	11.5	54.2	20	05	46	06	14	06	37	20	43	21	33	22	23	23	13		
	16	58	08.1		55.7	195	44.6	15.0	15	45.4	11.5	54.2	N	10	05	32	05	58	06	20	20	55	21	41	22	26	23	11	
	17	73	07.8		55.3	210	18.6	15.0	15	33.9	11.6	54.2	0	05	16	05	42	06	04	21	06	21	48	22	29	23	10		
	18	88	07.6	S21	55.0	224	52.6	15.1	N15	22.3	11.7	54.2	S	10	04	58	05	25	05	48	21	17	21	55	22	32	23	09	
	19	103	07.3		54.6	239	26.7	15.2	15	10.6	11.7	54.2	20	04	37	05	06	05	30	21	29	22	02	22	35	23	07		
	20	118	07.1		54.2	254	00.9	15.1	14	58.9	11.8	54.3	30	04	10	04	43	05	10	21	42	22	11	22	38	23	06		
	21	133	06.8		53.8	268	35.0	15.3	14	47.1	11.8	54.3	35	03	53	04	29	04	58	21	50	22	16	22	40	23	05		
	22	148	06.6		53.5	283	09.3	15.2	14	35.3	12.0	54.3	40	03	32	04	12	04	44	21	58	22	21	22	43	23	04		
23	163	06.3		53.1	297	43.5	15.3	14	23.3	11.9	54.3	45	03	04	03	51	04	28	22	08	22	28	22	45	23	03			
WEDNESDAY	11	00	178	06.1	S21	52.7	312	17.8	15.4	N14	11.4	12.1	54.3	S	50	02	25	03	24	04	07	22	21	22	35	22	49	23	01
	01	193	05.8		52.3	326	52.2	15.4	13	59.3	12.1	54.3	52	02	02	03	11	03	57	22	26	22	39	22	50	23	01		
	02	208	05.6		51.9	341	26.6	15.4	13	47.2	12.1	54.3	54	01	32	02	55	03	46	22	32	22	43	22	52	23	00		
	03	223	05.3		51.5	356	01.0	15.4	13	35.1	12.2	54.3	56	00	28	02	37	03	34	22	39	22	47	22	53	22	59		
	04	238	05.1		51.2	10	35.4	15.5	13	22.9	12.3	54.3	58	////	02	13	03	19	22	47	22	51	22	55	22	59			
	05	253	04.8		50.8	25	09.9	15.6	13	10.6	12.3	54.4	S	60	////	01	40	03	01	22	55	22	57	22	57	22	58		
	06	268	04.6	S21	50.4	39	44.5	15.5	N12	58.3	12.4	54.4	Lat.		Sunset		Twilight		Moonset										
	07	283	04.3		50.0	54	19.0	15.6	12	45.9	12.4	54.4					Civil		Naut.		10				11	12	13		
	08	298	04.1		49.6	68	53.6	15.7	12	33.5	12.5	54.4																	
	09	313	03.8		49.2	83	28.3	15.6	12	21.0	12.5	54.4																	
	10	328	03.6		48.8	98	02.9	15.7	12	08.5	12.6	54.4																	
	11	343	03.3		48.4	112	37.6	15.8	11	55.9	12.6	54.4	N	72	h	m	h	m	h	m	h	m	h	m	h	m	h	m	
	12	358	03.1	S21	48.1	127	12.4	15.7	N11	43.3	12.7	54.5	N	70	██	14	07	16	23	12	26	11	49	11	23	11	00		
	13	13	02.9		47.7	141	47.1	15.8	11	30.6	12.7	54.5	68	13	22	15	14	16	36	11	57	11	34	11	15	10	59		
	14	28	02.6		47.3	156	21.9	15.8	11	17.9	12.8	54.5	66	14	11	15	34	16	47	11	36	11	22	11	09	10	58		
	15	43	02.4		46.9	170	56.7	15.9	11	05.1	12.9	54.5	64	14	41	15	51	16	56	11	19	11	11	11	04	10	57		
	16	58	02.1		46.5	185	31.6	15.9	10	52.2	12.8	54.5	62	15	04	16	05	17	04	11	05	11	02	10	59	10	56		
	17	73	01.9		46.1	200	06.5	15.9	10	39.4	13.0	54.5	60	15	22	16	17	17	11	10	53	10	55	10	55	10	56		
	18	88	01.6	S21	45.7	214	41.4	15.9	N10	26.4	12.9	54.5	N	58	15	38	16	27	17	18	10	42	10	48	10	52	10	55	
	19	103	01.4		45.3	229	16.3	15.9	10	13.5	13.1	54.6	56	15	50	16	36	17	24	10	33	10	42	10	49	10	55		
	20	118	01.1		44.9	243	51.2	16.0	10	00.4	13.0	54.6	54	16	02	16	44	17	29	10	25	10	36	10	46	10	54		
	21	133	00.9		44.5	258	26.2	16.0	9	47.4	13.1	54.6	52	16	12	16	51	17	34	10	18	10	31	10	43	10	54		
	22	148	00.6		44.1	273	01.2	16.0	9	34.3	13.2	54.6	50	16	20	16	58	17	39	10	11	10	27	10	41	10	54		
23	163	00.4		43.7	287	36.2	16.1	9	21.1	13.2	54.6	45	16	39	17	12	17	49	09	57	10	17	10	35	10	53			
THURSDAY	12	00	178	00.2	S21	43.3	302	11.3	16.0	N 9	07.9	13.2	54.6	N	40	16	55	17	25	17	58	09	45	10	09	10	31	10	52
	01	192	59.9		42.9	316	46.3	16.1	8	54.7	13.3	54.7	35	17	07	17	35	18	06	09	35	10	02	10	27	10	52		
	02	207	59.7		42.5	331	21.4	16.1	8	41.4	13.3	54.7	30	17	19	17	45	18	14	09	26	09	56	10	24	10	51		
	03	222	59.4		42.1	345	56.5	16.1	8	28.1	13.3	54.7	20	17	38	18	02	18	29	09	10	09	45	10	18	10	50		
	04	237	59.2		41.7	0	31.6	16.1	8	14.8	13.4	54.7	N	10	17	55	18	18	18	44	08	57	09	35	10	13	10	49	
	05	252	58.9		41.3	15	06.7	16.1	8	01.4	13.5	54.7	0	18	11	18	34	19	00	08	44	09	26	10	08	10	48		
	06	267	58.7	S21	40.9	29	41.8	16.2	N 7	47.9	13.4	54.7	S	10	18	28	18	50	19	17	08</								

UT	ARIES	VENUS -3.9	MARS -0.8	JUPITER -2.3	SATURN +0.8	STARS		
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA	Dec
13 00 01 02 03 04 05	112 13.0	156 53.6 S18 34.8	46 20.6 N24 27.8	109 08.0 S 0 00.9	145 47.7 S14 48.0	Acamar	315 12.9	S40 13.0
	127 15.5	171 52.9 33.9	61 23.0 27.7	124 10.1 00.8	160 49.9 47.9	Achernar	335 21.4	S57 07.6
	142 17.9	186 52.2 33.0	76 25.5 27.7	139 12.3 00.6	175 52.1 47.8	Acrux	173 01.7	S63 13.3
	157 20.4	201 51.5 32.2	91 27.9 27.7	154 14.4 00.5	190 54.3 47.7	Adhara	255 06.8	S29 00.2
	172 22.9	216 50.8 31.3	106 30.4 27.7	169 16.5 00.3	205 56.5 47.6	Aldebaran	290 41.2	N16 33.3
	187 25.3	231 50.1 30.4	121 32.8 27.7	184 18.6 S 00.1	220 58.7 47.5			
	202 27.8	246 49.4 S18 29.6	136 35.3 N24 27.7	199 20.8 0 00.0	236 00.9 S14 47.5	Alioth	166 14.3	N55 49.8
	217 30.2	261 48.7 28.7	151 37.7 27.7	214 22.9 N 00.2	251 03.1 47.4	Alkaid	152 53.4	N49 11.6
	232 32.7	276 48.0 27.8	166 40.2 27.7	229 25.0 00.3	266 05.3 47.3	Alnair	27 35.4	S46 51.2
	247 35.2	291 47.3 27.0	181 42.6 27.7	244 27.1 00.5	281 07.5 47.2	Alnilam	275 39.1	S 1 11.3
F R I DAY 11 12 13 14 15 16 17	262 37.6	306 46.6 26.1	196 45.1 27.7	259 29.2 00.6	296 09.7 47.1	Alphard	217 49.1	S 8 45.5
	277 40.1	321 45.9 25.2	211 47.5 27.7	274 31.4 00.8	311 11.9 47.0			
	292 42.6	336 45.2 S18 24.3	226 50.0 N24 27.7	289 33.5 N 0 01.0	326 14.1 S14 46.9	Alphecca	126 05.3	N26 38.1
	307 45.0	351 44.5 23.5	241 52.4 27.7	304 35.6 01.1	341 16.3 46.8	Alpheratz	357 36.6	N29 13.1
	322 47.5	6 43.8 22.6	256 54.9 27.7	319 37.7 01.3	356 18.5 46.7	Altair	62 01.9	N 8 55.7
	337 50.0	21 43.1 21.7	271 57.3 27.7	334 39.8 01.4	11 20.7 46.6	Ankaa	353 08.9	S42 11.2
	352 52.4	36 42.5 20.8	286 59.7 27.7	349 42.0 01.6	26 22.9 46.6	Antares	112 18.1	S26 28.9
	7 54.9	51 41.8 20.0	302 02.2 27.7	4 44.1 01.8	41 25.1 46.5			
	22 57.3	66 41.1 S18 19.1	317 04.6 N24 27.7	19 46.2 N 0 01.9	56 27.3 S14 46.4	Arcturus	145 49.5	N19 03.6
	37 59.8	81 40.4 18.2	332 07.0 27.7	34 48.3 02.1	71 29.5 46.3	Atria	107 14.3	S69 03.9
20 21 22 23	53 02.3	96 39.7 17.3	347 09.5 27.7	49 50.4 02.2	86 31.7 46.2	Avior	234 14.7	S59 34.9
	68 04.7	111 39.0 16.4	2 11.9 27.7	64 52.6 02.1	101 33.9 46.1	Bellatrix	278 24.3	N 6 22.2
	83 07.2	126 38.3 15.5	17 14.3 27.7	79 54.7 02.6	116 36.1 46.0	Betelgeuse	270 53.5	N 7 24.6
	98 09.7	141 37.6 14.7	32 16.7 27.7	94 56.8 02.7	131 38.2 45.9			
	113 12.1	156 36.9 S18 13.8	47 19.2 N24 27.7	109 58.9 N 0 02.9	146 40.4 S14 45.8	Canopus	263 52.6	S52 42.5
	128 14.6	171 36.2 12.9	62 21.6 27.7	125 01.0 03.0	161 42.6 45.7	Capella	280 23.9	N46 01.3
	143 17.1	186 35.5 12.0	77 24.0 27.7	140 03.1 03.2	176 44.8 45.6	Deneb	49 27.4	N45 21.7
	158 19.5	201 34.9 11.1	92 26.4 27.7	155 05.3 03.3	191 47.0 45.6	Denebola	182 26.5	N14 26.5
	173 22.0	216 34.2 10.2	107 28.8 27.7	170 07.4 03.5	206 49.2 45.5	Diphda	348 49.0	S17 51.8
	188 24.5	231 33.5 09.3	122 31.3 27.7	185 09.5 03.7	221 51.4 45.4			
S A T U R D A Y 06 07 08 09 10 11 12	203 26.9	246 32.8 S18 08.5	137 33.7 N24 27.7	200 11.6 N 0 03.8	236 53.6 S14 45.3	Dubhe	193 42.6	N61 37.4
	218 29.4	261 32.1 07.6	152 36.1 27.7	215 13.7 04.0	251 55.8 45.2	Elnath	278 03.6	N28 37.6
	233 31.8	276 31.4 06.7	167 38.5 27.7	230 15.9 04.2	266 58.0 45.1	Eltanin	90 43.4	N51 29.0
	248 34.3	291 30.7 05.8	182 40.9 27.7	245 18.0 04.3	282 00.2 45.0	Enif	33 40.7	N 9 58.8
	263 36.8	306 30.1 04.9	197 43.3 27.7	260 20.1 04.5	297 02.4 44.9	Fomalhaut	15 16.6	S29 30.3
	278 39.2	321 29.4 04.0	212 45.7 27.7	275 22.2 04.6	312 04.6 44.8			
	293 41.7	336 28.7 S18 03.1	227 48.1 N24 27.7	290 24.3 N 0 04.8	327 06.8 S14 44.7	Gacrux	171 53.3	S57 14.2
	308 44.2	351 28.0 02.2	242 50.6 27.7	305 26.4 05.0	342 09.0 44.6	Gienah	175 45.2	S17 40.1
	323 46.6	6 27.3 01.3	257 53.0 27.7	320 28.5 05.1	357 11.2 44.5	Hadar	148 38.4	S60 28.7
	338 49.1	21 26.7 18 00.4	272 55.4 27.7	335 30.7 05.3	12 13.4 44.5	Hamal	327 53.0	N23 34.3
16 17 18 19 20 21 22 23	353 51.6	36 26.0 17 59.5	287 57.8 27.7	350 32.8 05.4	27 15.6 44.4	Kaus Aust.	83 35.1	S34 22.4
	8 54.0	51 25.3 58.6	303 00.2 27.7	5 34.9 05.6	42 17.8 44.3			
	23 56.5	66 24.6 S17 57.7	318 02.6 N24 27.7	20 37.0 N 0 05.8	57 20.0 S14 44.2	Kochab	137 20.2	N74 03.3
	38 59.0	81 23.9 56.8	333 05.0 27.7	35 39.1 05.9	72 22.2 44.1	Markab	13 31.7	N15 19.7
	54 01.4	96 23.3 55.9	348 07.4 27.7	50 41.2 06.1	87 24.4 44.0	Menkar	314 07.7	N 4 10.7
	69 03.9	111 22.6 55.0	3 09.7 27.7	65 43.3 06.2	102 26.6 43.9	Menkent	147 59.6	S36 28.8
	84 06.3	126 21.9 54.1	18 12.1 27.7	80 45.5 06.4	117 28.7 43.8	Miaplacidus	221 37.7	S69 48.5
	99 08.8	141 21.2 53.2	33 14.5 27.7	95 47.6 06.6	132 30.9 43.7			
	114 11.3	156 20.6 S17 52.3	48 16.9 N24 27.7	110 49.7 N 0 06.7	147 33.1 S14 43.6	Mirfak	308 30.3	N49 56.7
	129 13.7	171 19.9 51.4	63 19.3 27.7	125 51.8 06.9	162 35.3 43.5	Nunki	75 50.2	S26 16.1
15 00 01 02 03 04 05	144 16.2	186 19.2 50.5	78 21.7 27.7	140 53.9 07.1	177 37.5 43.5	Peacock	53 08.9	S56 39.8
	159 18.7	201 18.5 49.6	93 24.1 27.7	155 56.0 07.2	192 39.7 43.4	Pollux	243 18.9	N27 58.2
	174 21.1	216 17.9 48.7	108 26.5 27.7	170 58.1 07.4	207 41.9 43.3	Procyon	244 52.2	N 5 09.9
	189 23.6	231 17.2 47.7	123 28.9 27.7	186 00.2 07.5	222 44.1 43.2			
	204 26.1	246 16.5 S17 46.8	138 31.2 N24 27.7	201 02.4 N 0 07.7	237 46.3 S14 43.1	Rasalhague	96 00.4	N12 32.5
	219 28.5	261 15.8 45.9	153 33.6 27.7	216 04.5 07.9	252 48.5 43.0	Regulus	207 35.9	N11 51.2
	234 31.0	276 15.2 45.0	168 36.0 27.7	231 06.6 08.0	267 50.7 42.9	Rigel	281 05.2	S 8 10.6
	249 33.4	291 14.5 44.1	183 38.4 27.7	246 08.7 08.2	282 52.9 42.8	Rigel Kent.	139 42.8	S60 55.5
	264 35.9	306 13.8 43.2	198 40.7 27.7	261 10.8 08.4	297 55.1 42.7	Sabik	102 05.0	S15 45.2
	279 38.4	321 13.2 42.3	213 43.1 27.7	276 12.9 08.5	312 57.3 42.6			
S U N D A Y 12 13 14 15 16 17 18 19 20 21 22 23	294 40.8	336 12.5 S17 41.4	228 45.5 N24 27.7	291 15.0 N 0 08.7	327 59.5 S14 42.5	Schedar	349 33.0	N56 40.0
	309 43.3	351 11.8 40.4	243 47.9 27.7	306 17.1 08.8	343 01.7 42.4	Shaula	96 13.0	S37 07.2
	324 45.8	6 11.2 39.5	258 50.2 27.7	321 19.2 09.0	358 03.9 42.3	Sirius	258 27.3	S16 44.9
	339 48.2	21 10.5 38.6	273 52.6 27.7	336 21.3 09.2	13 06.0 42.3	Spica	158 24.0	N11 16.8
	354 50.7	36 09.8 37.7	288 55.0 27.7	351 23.5 09.3	28 08.2 42.2	Suhail	222 47.1	S43 31.4
	9 53.2	51 09.2 36.8	303 57.3 27.7	6 25.6 09.5	43 10.4 42.1			
	24 55.6	66 08.5 S17 35.8	318 59.7 N24 27.7	21 27.7 N 0 09.7	58 12.6 S14 42.0	Vega	80 34.8	N38 48.2
	39 58.1	81 07.8 34.9	334 02.1 27.7	36 29.8 09.8	73 14.8 41.9	Zuben'ubi	136 58.0	S16 08.2
	55 00.6	96 07.2 34.0	349 04.4 27.7	51 31.9 10.0	88 17.0 41.8			
	70 03.0	111 06.5 33.1	4 06.8 27.7	66 34.0 10.1	103 19.2 41.7			
Mer.Pass. 16 24.5	85 05.5	126 05.8 32.1	19 09.1 27.7	81 36.1 10.3	118 21.4 41.6	Venus	43 24.8	h 3 34
	100 07.9	141 05.2 31.2	34 11.5 27.8	96 38.2 10.5	133 23.6 41.5	Mars	294 07.0	20 47
						Jupiter	356 46.8	16 38
						Saturn	33 28.3	14 11

UT	SUN				MOON							Lat.	Twilight		Sunrise	Moonrise									
	GHA		Dec		GHA		v		Dec		d		HP			Naut.	Civil	13	14	15	16				
d	h	m	s	°	'	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m
13 FRI DAY	00	177	54.4	S21	33.5	292	15.5	16.2	N	3	40.5	14.1	55.1	N 72	08 03	09 57	23 35	25 42	01 42	04 15					
	01	192	54.2		33.1	306	50.7	16.2		3	26.4	14.0	55.1	N 70	07 48	09 21	23 32	25 29	01 29	03 42					
	02	207	53.9		32.7	321	25.9	16.1		3	12.4	14.1	55.2	68	07 36	08 56	10 39	23 30	25 18	01 18	03 19				
	03	222	53.7		32.3	336	01.0	16.2		2	58.3	14.1	55.2	66	07 26	08 37	09 57	23 28	25 10	01 10	03 01				
	04	237	53.5		31.8	350	36.2	16.2		2	44.2	14.1	55.2	64	07 17	08 21	09 28	23 26	25 03	01 03	02 46				
	05	252	53.2		31.4	5	11.4	16.1		2	30.1	14.1	55.2	62	07 09	08 08	09 07	23 25	24 56	00 56	02 34				
	06	267	53.0	S21	31.0	19	46.5	16.2	N	2	16.0	14.2	55.3	60	07 02	07 56	08 50	23 24	24 51	00 51	02 24				
	07	282	52.7		30.6	34	21.7	16.1		2	01.8	14.1	55.3	N 58	06 56	07 46	08 35	23 23	24 46	00 46	02 15				
	08	297	52.5		30.2	48	56.8	16.1		1	47.7	14.2	55.3	56	06 50	07 38	08 23	23 22	24 42	00 42	02 07				
	09	312	52.3		29.7	63	31.9	16.1		1	33.5	14.3	55.3	54	06 45	07 30	08 12	23 21	24 38	00 38	02 00				
	10	327	52.0		29.3	78	07.0	16.0		1	19.2	14.2	55.4	52	06 40	07 23	08 02	23 20	24 35	00 35	01 54				
	11	342	51.8		28.9	92	42.0	16.1		1	05.0	14.2	55.4	50	06 36	07 17	07 54	23 19	24 32	00 32	01 49				
	12	357	51.6	S21	28.5	107	17.1	16.0	N	0	50.8	14.3	55.4	45	06 26	07 02	07 35	23 18	24 26	00 26	01 37				
	13	12	51.3		28.0	121	52.1	16.0		0	36.5	14.3	55.4	N 40	06 17	06 51	07 20	23 17	24 20	00 20	01 27				
	14	27	51.1		27.6	136	27.1	16.0		0	22.2	14.3	55.5	35	06 09	06 40	07 08	23 15	24 15	00 15	01 19				
	15	42	50.9		27.2	151	02.1	16.0	N	0	07.9	14.3	55.5	30	06 01	06 31	06 57	23 14	24 11	00 11	01 11				
	16	57	50.6		26.8	165	37.1	15.9	S	0	06.4	14.3	55.5	20	05 47	06 14	06 38	23 13	24 04	00 04	00 59				
	17	72	50.4		26.3	180	12.0	15.9		0	20.7	14.3	55.6	N 10	05 33	05 59	06 21	23 11	23 58	24 48	00 48				
	18	87	50.2	S21	25.9	194	46.9	15.9	S	0	35.0	14.4	55.6	0	05 17	05 43	06 05	23 10	23 53	24 38	00 38				
	19	102	49.9		25.5	209	21.8	15.8		0	49.4	14.3	55.6	S 10	05 00	05 27	05 49	23 09	23 47	24 28	00 28				
	20	117	49.7		25.0	223	56.6	15.9		1	03.7	14.4	55.6	20	04 40	05 08	05 32	23 07	23 41	24 17	00 17				
	21	132	49.5		24.6	238	31.5	15.7		1	18.1	14.3	55.7	30	04 13	04 46	05 12	23 06	23 34	24 05	00 05				
	22	147	49.2		24.2	253	06.2	15.8		1	32.4	14.4	55.7	35	03 56	04 32	05 01	23 05	23 30	23 59	24 31				
	23	162	49.0		23.7	267	41.0	15.7		1	46.8	14.4	55.7	40	03 36	04 15	04 47	23 04	23 26	23 51	24 20				
	14 SAT URDAY	00	177	48.8	S21	23.3	282	15.7	15.7	S	2	01.2	14.4	55.7	45	03 09	03 55	04 31	23 03	23 21	23 42	24 07			
01		192	48.6		22.9	296	50.4	15.6		2	15.6	14.4	55.8	S 50	02 31	03 29	04 11	23 01	23 15	23 31	23 51				
02		207	48.3		22.4	311	25.0	15.6		2	30.0	14.4	55.8	52	02 10	03 16	04 02	23 01	23 12	23 26	23 43				
03		222	48.1		22.0	325	59.6	15.6		2	44.4	14.4	55.8	54	01 42	03 01	03 51	23 00	23 09	23 21	23 35				
04		237	47.9		21.6	340	34.2	15.5		2	58.8	14.4	55.9	56	00 55	02 43	03 39	22 59	23 06	23 14	23 26				
05		252	47.6		21.1	355	08.7	15.5		3	13.2	14.4	55.9	58	////	02 21	03 25	22 59	23 03	23 08	23 15				
06		267	47.4	S21	20.7	9	43.2	15.5	S	3	27.6	14.5	55.9	S 60	////	01 51	03 08	22 58	22 59	23 00	23 03				
07		282	47.2		20.3	24	17.7	15.3		3	42.1	14.4	56.0	Lat.		Sunset		Twilight		Moonset					
08		297	46.9		19.8	38	52.0	15.4		3	56.5	14.4	56.0					Civil		Naut.		13	14	15	16
09		312	46.7		19.4	53	26.4	15.3		4	10.9	14.4	56.0									h m	h m	h m	h m
10		327	46.5		18.9	68	00.7	15.2		4	25.3	14.4	56.0	N 72	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	
11		342	46.3		18.5	82	34.9	15.2		4	39.7	14.4	56.1	N 70	14 22	16 15	16 15	11 01	10 31	09 55	08 59				
12		357	46.0	S21	18.0	97	09.1	15.2	S	4	54.1	14.4	56.1	N 70	14 57	16 30	16 30	11 00	10 37	10 11	09 34				
13		12	45.8		17.6	111	43.3	15.1		5	08.5	14.4	56.1	68	13 40	15 22	16 43	10 59	10 42	10 23	09 59				
14		27	45.6		17.2	126	17.4	15.0		5	22.9	14.4	56.2	66	14 22	15 42	16 53	10 58	10 46	10 34	10 18				
15		42	45.4		16.7	140	51.4	15.0		5	37.3	14.4	56.2	64	14 50	15 58	17 02	10 57	10 50	10 43	10 34				
16		57	45.1		16.3	155	25.4	14.9		5	51.7	14.4	56.2	62	15 12	16 11	17 10	10 56	10 53	10 50	10 48				
17		72	44.9		15.8	169	59.3	14.9		6	06.1	14.4	56.3	60	15 29	16 22	17 16	10 56	10 56	10 57	10 59				
18		87	44.7	S21	15.4	184	33.2	14.8	S	6	20.5	14.3	56.3	N 58	15 43	16 32	17 22	10 55	10 59	11 03	11 09				
19		102	44.5		14.9	199	07.0	14.8		6	34.8	14.4	56.3	56	15 56	16 41	17 28	10 55	11 01	11 08	11 17				
20		117	44.2		14.5	213	40.8	14.7		6	49.2	14.3	56.4	54	16 07	16 48	17 33	10 54	11 03	11 13	11 25				
21		132	44.0		14.0	228	14.5	14.6		7	03.5	14.4	56.4	52	16 16	16 55	17 38	10 54	11 05	11 17	11 32				
22		147	43.8		13.6	242	48.1	14.5		7	17.9	14.3	56.4	50	16 25	17 02	17 42	10 54	11 07	11 21	11 38				
23		162	43.6		13.1	257	21.6	14.5		7	32.2	14.3	56.5	45	16 43	17 16	17 52	10 53	11 10	11 30	11 52				
15 SUN DAY		00	177	43.3	S21	12.7	271	55.1	14.5	S	7	46.5	14.3	56.5	N 40	16 58	17 28	18 01	10 52	11 14	11 37	12 03			
	01	192	43.1		12.2	286	28.6	14.3		8	00.8	14.2	56.5	35	17 10	17 38	18 09	10 52	11 16	11 43	12 13				
	02	207	42.9		11.8	301	01.9	14.3		8	15.0	14.3	56.6	30	17 21	17 47	18 17	10 51	11 19	11 48	12 21				
	03	222	42.7		11.3	315	35.2	14.2		8	29.3	14.2	56.6	20	17 40	18 04	18 31	10 50	11 23	11 58	12 36				
	04	237	42.4		10.9	330	08.4	14.1		8	43.5	14.2	56.6	N 10	17 57	18 19	18 45	10 49	11 27	12 06	12 49				
	05	252	42.2		10.4	344	41.5	14.1		8	57.7	14.2	56.7	0	18 13	18 35	19 01	10 48	11 30	12 14	13 01				
	06	267	42.0	S21	10.0	359	14.6	14.0	S	9	11.9	14.2	56.7	S 10	18 28	18 51	19 18	10 48	11 34	12 22	13 13				
	07	282	41.8		09.5	13	47.6	13.9		9	26.1	14.1	56.8	20	18 45	19 10	19 38	10 47	11 37	12 30	13 26				
	08	297	41.5		09.0	28	20.5	13.8		9	40.2	14.2	56.8	30	19 05	19 32	20 04	10 46	11 42	12 40	13 42				
	09	312	41.3		08.6	42	53.3	13.8		9	54.4	14.1	56.8	35	19 17	19 46	20 21	10 45	11 44	12 45	13 50				
	10	327	41.1		08.1	57	26.1	13.7		10	08.5	14.0	56.9	40	19 30	20 02	20 42	10 44	11 47	12 52	14 00				
	11	342	40.9		07.7	71	58.8	13.5		10	22.5	14.1	56.9	45	19 46	20 22	21 08	10 44	11 50	12 59	14 12				
	12																								

UT	ARIES		VENUS −3.9		MARS −0.7		JUPITER −2.3		SATURN +0.8		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
MONDAY	115 10.4	156 04.5 S17 30.3	49 13.9 N24 27.8	111 40.3 N 0 10.6	148 25.8 S14 41.4	Acamar	315 12.9	S40 13.0					
	130 12.9	171 03.9 29.4	64 16.2 27.8	126 42.4 10.8	163 28.0 41.3	Achernar	335 21.4	S57 07.6					
	145 15.3	186 03.2 28.4	79 18.6 27.8	141 44.5 11.0	178 30.2 41.2	Acruhs	173 01.6	S63 13.3					
	160 17.8	201 02.5 . . 27.5	94 20.9 . . 27.8	156 46.6 . . 11.1	193 32.4 . . 41.2	Adhara	255 06.8	S29 00.2					
	175 20.3	216 01.9 26.6	109 23.3 27.8	171 48.8 11.3	208 34.6 41.1	Aldebaran	290 41.2	N16 33.3					
	190 22.7	231 01.2 25.6	124 25.6 27.8	186 50.9 11.5	223 36.8 41.0								
	205 25.2	246 00.6 S17 24.7	139 28.0 N24 27.8	201 53.0 N 0 11.6	238 38.9 S14 40.9	Alioth	166 14.3	N55 49.8					
	220 27.7	260 59.9 23.8	154 30.3 27.8	216 55.1 11.8	253 41.1 40.8	Alkaid	152 53.3	N49 11.6					
	235 30.1	275 59.2 22.9	169 32.7 27.8	231 57.2 12.0	268 43.3 40.7	Alnair	27 35.4	S46 51.2					
	250 32.6	290 58.6 . . 21.9	184 35.0 . . 27.8	246 59.3 . . 12.1	283 45.5 . . 40.6	Alnilam	275 39.1	S 1 11.3					
	265 35.1	305 57.9 21.0	199 37.3 27.8	262 01.4 12.3	298 47.7 40.5	Alphard	217 49.1	S 8 45.5					
	280 37.5	320 57.3 20.0	214 39.7 27.8	277 03.5 12.4	313 49.9 40.4								
	295 40.0	335 56.6 S17 19.1	229 42.0 N24 27.8	292 05.6 N 0 12.6	328 52.1 S14 40.3	Alphecca	126 05.3	N26 38.1					
	310 42.4	350 56.0 18.2	244 44.4 27.8	307 07.7 12.8	343 54.3 40.2	Alpheratz	357 36.6	N29 13.1					
	325 44.9	5 55.3 17.2	259 46.7 27.9	322 09.8 12.9	358 56.5 40.1	Altair	62 01.9	N 8 55.7					
	340 47.4	20 54.7 . . 16.3	274 49.0 . . 27.9	337 11.9 . . 13.1	13 58.7 . . 40.0	Ankaa	353 08.9	S42 11.2					
	355 49.8	35 54.0 15.4	289 51.4 27.9	352 14.0 13.3	29 00.9 40.0	Antares	112 18.1	S26 28.9					
	10 52.3	50 53.3 14.4	304 53.7 27.9	7 16.1 13.4	44 03.1 39.9								
	25 54.8	65 52.7 S17 13.5	319 56.0 N24 27.9	22 18.2 N 0 13.6	59 05.3 S14 39.8	Arcturus	145 49.5	N19 03.6					
	40 57.2	80 52.0 12.5	334 58.4 27.9	37 20.3 13.8	74 07.4 39.7	Atria	107 14.2	S69 03.9					
	55 59.7	95 51.4 11.6	350 00.7 27.9	52 22.4 13.9	89 09.6 39.6	Avior	234 14.7	S59 34.9					
	71 02.2	110 50.7 . . 10.6	5 03.0 . . 27.9	67 24.5 . . 14.1	104 11.8 . . 39.5	Bellatrix	278 24.3	N 6 22.2					
	86 04.6	125 50.1 09.7	20 05.3 27.9	82 26.6 14.3	119 14.0 39.4	Betelgeuse	270 53.5	N 7 24.6					
	101 07.1	140 49.4 08.8	35 07.7 27.9	97 28.7 14.4	134 16.2 39.3								
	TUESDAY	116 09.5	155 48.8 S17 07.8	50 10.0 N24 27.9	112 30.8 N 0 14.6	149 18.4 S14 39.2	Canopus	263 52.6	S52 42.5				
131 12.0		170 48.2 06.9	65 12.3 27.9	127 33.0 14.8	164 20.6 39.1	Capella	280 23.9	N46 01.3					
146 14.5		185 47.5 05.9	80 14.6 28.0	142 35.1 14.9	179 22.8 39.0	Deneb	49 27.4	N45 21.7					
161 16.9		200 46.9 . . 05.0	95 17.0 . . 28.0	157 37.2 . . 15.1	194 25.0 . . 38.9	Denebola	182 26.5	N14 26.5					
176 19.4		215 46.2 04.0	110 19.3 28.0	172 39.3 15.3	209 27.2 38.8	Diphda	348 49.0	S17 51.8					
191 21.9		230 45.6 03.1	125 21.6 28.0	187 41.4 15.4	224 29.4 38.7								
206 24.3		245 44.9 S17 02.1	140 23.9 N24 28.0	202 43.5 N 0 15.6	239 31.6 S14 38.7	Dubhe	193 42.6	N61 37.4					
221 26.8		260 44.3 01.2	155 26.2 28.0	217 45.6 15.8	254 33.7 38.6	Elnath	278 03.6	N28 37.6					
236 29.3		275 43.6 17 00.2	170 28.5 28.0	232 47.7 15.9	269 35.9 38.5	Eltanin	90 43.4	N51 29.0					
251 31.7		290 43.0 16 59.3	185 30.8 . . 28.0	247 49.8 . . 16.1	284 38.1 . . 38.4	Enif	33 40.7	N 9 58.7					
266 34.2		305 42.4 58.3	200 33.1 28.0	262 51.9 16.3	299 40.3 38.3	Fomalhaut	15 16.6	S29 30.3					
281 36.7		320 41.7 57.3	215 35.5 28.0	277 54.0 16.4	314 42.5 38.2								
296 39.1		335 41.1 S16 56.4	230 37.8 N24 28.1	292 56.1 N 0 16.6	329 44.7 S14 38.1	Gacrux	171 53.3	S57 14.2					
311 41.6		350 40.4 55.4	245 40.1 28.1	307 58.2 16.8	344 46.9 38.0	Gienah	175 45.1	S17 40.1					
326 44.0		5 39.8 54.5	260 42.4 28.1	323 00.3 16.9	359 49.1 37.9	Hadar	148 38.4	S60 28.7					
341 46.5		20 39.1 . . 53.5	275 44.7 . . 28.1	338 02.4 . . 17.1	14 51.3 . . 37.8	Hamal	327 53.0	N23 34.3					
356 49.0		35 38.5 52.6	290 47.0 28.1	353 04.5 17.3	29 53.5 37.7	Kaus Aust.	83 35.1	S34 22.4					
11 51.4		50 37.9 51.6	305 49.3 28.1	8 06.6 17.4	44 55.7 37.6								
26 53.9		65 37.2 S16 50.6	320 51.6 N24 28.1	23 08.7 N 0 17.6	59 57.8 S14 37.5	Kochab	137 20.2	N74 03.3					
41 56.4		80 36.6 49.7	335 53.9 28.1	38 10.8 17.8	75 00.0 37.4	Markab	13 31.7	N15 19.7					
56 58.8		95 36.0 48.7	350 56.2 28.2	53 12.9 17.9	90 02.2 37.3	Menkar	314 07.7	N 4 10.7					
72 01.3		110 35.3 . . 47.7	5 58.5 . . 28.2	68 15.0 . . 18.1	105 04.4 . . 37.3	Menkent	147 59.6	S36 28.8					
87 03.8		125 34.7 46.8	21 00.8 28.2	83 17.1 18.3	120 06.6 37.2	Miaplacidus	221 37.7	S69 48.5					
102 06.2		140 34.1 45.8	36 03.0 28.2	98 19.2 18.4	135 08.8 37.1								
WEDNESDAY		117 08.7	155 33.4 S16 44.8	51 05.3 N24 28.2	113 21.3 N 0 18.6	150 11.0 S14 37.0	Mirfak	308 30.4	N49 56.7				
	132 11.2	170 32.8 43.9	66 07.6 28.2	128 23.3 18.8	165 13.2 36.9	Nunki	75 50.2	S26 16.1					
	147 13.6	185 32.1 42.9	81 09.9 28.2	143 25.4 18.9	180 15.4 36.8	Peacock	53 08.9	S56 39.8					
	162 16.1	200 31.5 . . 41.9	96 12.2 . . 28.2	158 27.5 . . 19.1	195 17.6 . . 36.7	Pollux	243 18.9	N27 58.2					
	177 18.5	215 30.9 41.0	111 14.5 28.3	173 29.6 19.3	210 19.7 36.6	Procyon	244 52.2	N 5 09.9					
	192 21.0	230 30.3 40.0	126 16.8 28.3	188 31.7 19.4	225 21.9 36.5								
	207 23.5	245 29.6 S16 39.0	141 19.0 N24 28.3	203 33.8 N 0 19.6	240 24.1 S14 36.4	Rasalhague	96 00.4	N12 32.5					
	222 25.9	260 29.0 38.1	156 21.3 28.3	218 35.9 19.8	255 26.3 36.3	Regulus	207 35.9	N11 51.2					
	237 28.4	275 28.4 37.1	171 23.6 28.3	233 38.0 20.0	270 28.5 36.2	Rigel	281 05.2	S 8 10.6					
	252 30.9	290 27.7 . . 36.1	186 25.9 . . 28.3	248 40.1 . . 20.1	285 30.7 . . 36.1	Rigel Kent.	139 42.7	S60 55.5					
	267 33.3	305 27.1 35.1	201 28.2 28.3	263 42.2 20.3	300 32.9 36.0	Sabik	102 04.9	S15 45.2					
	282 35.8	320 26.5 34.2	216 30.4 28.4	278 44.3 20.5	315 35.1 35.9								
	297 38.3	335 25.8 S16 33.2	231 32.7 N24 28.4	293 46.4 N 0 20.6	330 37.3 S14 35.9	Schedar	349 33.0	N56 40.0					
	312 40.7	350 25.2 32.2	246 35.0 28.4	308 48.5 20.8	345 39.5 35.8	Shaula	96 12.9	S37 07.1					
	327 43.2	5 24.6 31.2	261 37.2 28.4	323 50.6 21.0	0 41.6 35.7	Sirius	258 27.3	S16 44.9					
	342 45.7	20 24.0 . . 30.3	276 39.5 . . 28.4	338 52.7 . . 21.1	15 43.8 . . 35.6	Spica	158 24.0	S11 16.8					
	357 48.1	35 23.3 29.3	291 41.8 28.4	353 54.8 21.3	30 46.0 35.5	Suhail	222 47.1	S43 31.4					
	12 50.6	50 22.7 28.3	306 44.1 28.4	8 56.9 21.5	45 48.2 35.4								
	27 53.0	65 22.1 S16 27.3	321 46.3 N24 28.5	23 59.0 N 0 21.6	60 50.4 S14 35.3	Vega	80 34.7	N38 48.2					
	42 55.5	80 21.5 26.3	336 48.6 28.5	39 01.1 21.8	75 52.6 35.2	Zuben'ubi	136 57.9	S16 08.2					
	57 58.0	95 20.8 25.4	351 50.8 28.5	54 03.2 22.0	90 54.8 35.1								
	73 00.4	110 20.2 . . 24.4	6 53.1 . . 28.5	69 05.3 . . 22.2	105 57.0 . . 35.0								
	88 02.9	125 19.6 23.4	21 55.4 28.5	84 07.3 22.3	120 59.2 34.9	Venus	39 39.3	13 37					
	103 05.4	140 19.0 22.4	36 57.6 28.5	99 09.4 22.5	136 01.4 34.8	Mars	294 00.4	20 36					
						Jupiter	356 21.3	16 28					
					Saturn	33 08.9	14 01						
Mer. Pass. 16 12.7 v −0.6 d 1.0 v 2.3 d 0.0 v 2.1 d 0.2 v 2.2 d 0.1													

UT	ARIES			VENUS -3.9			MARS -0.6			JUPITER -2.2			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
19	118 07.8	155 18.4	S16 21.4	51 59.9	N24 28.6	114 11.5	N 0 22.7	151 03.5	S14 34.7	Acamar	315 12.9	S40 13.0						
01	133 10.3	170 17.7	20.4	67 02.1	28.6	129 13.6	22.8	166 05.7	34.6	Achernar	335 21.4	S57 07.5						
02	148 12.8	185 17.1	19.5	82 04.4	28.6	144 15.7	23.0	181 07.9	34.5	Acruz	173 01.6	S63 13.3						
03	163 15.2	200 16.5	18.5	97 06.6	28.6	159 17.8	23.2	196 10.1	34.4	Adhara	255 06.8	S29 00.3						
04	178 17.7	215 15.9	17.5	112 08.9	28.6	174 19.9	23.3	211 12.3	34.4	Aldebaran	290 41.2	N16 33.3						
05	193 20.2	230 15.3	16.5	127 11.1	28.6	189 22.0	23.5	226 14.5	34.3									
06	208 22.6	245 14.6	S16 15.5	142 13.4	N24 28.7	204 24.1	N 0 23.7	241 16.7	S14 34.2	Alioth	166 14.3	N55 49.8						
07	223 25.1	260 14.0	14.5	157 15.6	28.7	219 26.2	23.9	256 18.9	34.1	Alkaid	152 53.3	N49 11.6						
08	238 27.5	275 13.4	13.5	172 17.9	28.7	234 28.3	24.0	271 21.0	34.0	Alnair	27 35.4	S46 51.1						
09	253 30.0	290 12.8	12.5	187 20.1	28.7	249 30.4	24.2	286 23.2	33.9	Anilam	275 39.1	S 1 11.3						
10	268 32.5	305 12.2	11.5	202 22.4	28.7	264 32.4	24.4	301 25.4	33.8	Alphard	217 49.0	S 8 45.5						
11	283 34.9	320 11.6	10.5	217 24.6	28.8	279 34.5	24.5	316 27.6	33.7									
12	298 37.4	335 11.0	S16 09.5	232 26.9	N24 28.8	294 36.6	N 0 24.7	331 29.8	S14 33.6	Alphecca	126 05.3	N26 38.0						
13	313 39.9	350 10.3	08.6	247 29.1	28.8	309 38.7	24.9	346 32.0	33.5	Alpheratz	357 36.6	N29 13.1						
14	328 42.3	5 09.7	07.6	262 31.3	28.8	324 40.8	25.1	1 34.2	33.4	Altair	62 01.9	N 8 55.6						
15	343 44.8	20 09.1	06.6	277 33.6	28.8	339 42.9	25.2	16 36.4	33.3	Ankaa	353 08.9	S42 11.2						
16	358 47.3	35 08.5	05.6	292 35.8	28.8	354 45.0	25.4	31 38.6	33.2	Antares	112 18.1	S26 28.9						
17	13 49.7	50 07.9	04.6	307 38.1	28.9	9 47.1	25.6	46 40.7	33.1									
18	28 52.2	65 07.3	S16 03.6	322 40.3	N24 28.9	24 49.2	N 0 25.7	61 42.9	S14 33.0	Arcturus	145 49.4	N19 03.6						
19	43 54.7	80 06.7	02.6	337 42.5	28.9	39 51.3	25.9	76 45.1	32.9	Atria	107 14.2	S69 03.9						
20	58 57.1	95 06.1	01.6	352 44.7	28.9	54 53.3	26.1	91 47.3	32.8	Avior	234 14.7	S59 34.9						
21	73 59.6	110 05.4	16 00.6	7 47.0	28.9	69 55.4	26.3	106 49.5	32.8	Bellatrix	278 24.3	N 6 22.2						
22	89 02.0	125 04.8	15 59.6	22 49.2	29.0	84 57.5	26.4	121 51.7	32.7	Betelgeuse	270 53.5	N 7 24.6						
23	104 04.5	140 04.2	58.6	37 51.4	29.0	99 59.6	26.6	136 53.9	32.6									
20	119 07.0	155 03.6	S15 57.6	52 53.7	N24 29.0	115 01.7	N 0 26.8	151 56.1	S14 32.5	Canopus	263 52.6	S52 42.6						
01	134 09.4	170 03.0	56.6	67 55.9	29.0	130 03.8	26.9	166 58.2	32.4	Capella	280 23.9	N46 01.3						
02	149 11.9	185 02.4	55.5	82 58.1	29.0	145 05.9	27.1	182 00.4	32.3	Deneb	49 27.4	N45 21.7						
03	164 14.4	200 01.8	54.5	98 00.3	29.1	160 08.0	27.3	197 02.6	32.2	Denebola	182 26.4	N14 26.5						
04	179 16.8	215 01.2	53.5	113 02.5	29.1	175 10.0	27.5	212 04.8	32.1	Diphda	348 49.0	S17 51.8						
05	194 19.3	230 00.6	52.5	128 04.8	29.1	190 12.1	27.6	227 07.0	32.0									
06	209 21.8	245 00.0	S15 51.5	143 07.0	N24 29.1	205 14.2	N 0 27.8	242 09.2	S14 31.9	Dubhe	193 42.5	N61 37.4						
07	224 24.2	259 59.4	50.5	158 09.2	29.1	220 16.3	28.0	257 11.4	31.8	Elnath	278 03.6	N28 37.6						
08	239 26.7	274 58.8	49.5	173 11.4	29.2	235 18.4	28.2	272 13.6	31.7	Eltanin	90 43.4	N51 28.9						
09	254 29.2	289 58.2	48.5	188 13.6	29.2	250 20.5	28.3	287 15.7	31.6	Enif	33 40.7	N 9 58.8						
10	269 31.6	304 57.6	47.5	203 15.8	29.2	265 22.6	28.5	302 17.9	31.5	Fomalhaut	15 16.6	S29 30.2						
11	284 34.1	319 57.0	46.5	218 18.0	29.2	280 24.7	28.7	317 20.1	31.4									
12	299 36.5	334 56.4	S15 45.5	233 20.3	N24 29.3	295 26.7	N 0 28.8	332 22.3	S14 31.3	Gacrux	171 53.2	S57 14.2						
13	314 39.0	349 55.8	44.4	248 22.5	29.3	310 28.8	29.0	347 24.5	31.2	Gienah	175 45.1	S17 40.1						
14	329 41.5	4 55.2	43.4	263 24.7	29.3	325 30.9	29.2	2 26.7	31.1	Hadar	148 38.3	S60 28.7						
15	344 43.9	19 54.6	42.4	278 26.9	29.3	340 33.0	29.4	17 28.9	31.0	Hamal	327 53.0	S23 34.3						
16	359 46.4	34 54.0	41.4	293 29.1	29.3	355 35.1	29.5	32 31.1	31.0	Kaus Aust.	83 35.0	S34 22.4						
17	14 48.9	49 53.4	40.4	308 31.3	29.4	10 37.2	29.7	47 33.2	30.9									
18	29 51.3	64 52.8	S15 39.4	323 33.5	N24 29.4	25 39.2	N 0 29.9	62 35.4	S14 30.8	Kochab	137 20.1	N74 03.3						
19	44 53.8	79 52.2	38.3	338 35.7	29.4	40 41.3	30.1	77 37.6	30.7	Markab	13 31.7	N15 19.7						
20	59 56.3	94 51.6	37.3	353 37.9	29.4	55 43.4	30.2	92 39.8	30.6	Menkar	314 07.7	N 4 10.7						
21	74 58.7	109 51.0	36.3	8 40.1	29.5	70 45.5	30.4	107 42.0	30.5	Menkent	147 59.6	S36 28.8						
22	90 01.2	124 50.4	35.3	23 42.3	29.5	85 47.6	30.6	122 44.2	30.4	Miaplacidus	221 37.7	S69 48.5						
23	105 03.6	139 49.8	34.3	38 44.5	29.5	100 49.7	30.7	137 46.4	30.3									
21	120 06.1	154 49.2	S15 33.2	53 46.7	N24 29.5	115 51.7	N 0 30.9	152 48.5	S14 30.2	Mirfak	308 30.4	N49 56.7						
01	135 08.6	169 48.6	32.2	68 48.9	29.6	130 53.8	31.1	167 50.7	30.1	Nunki	75 50.1	S26 16.1						
02	150 11.0	184 48.0	31.2	83 51.1	29.6	145 55.9	31.3	182 52.9	30.0	Peacock	53 08.9	S56 39.8						
03	165 13.5	199 47.4	30.2	98 53.2	29.6	160 58.0	31.4	197 55.1	29.9	Pollux	243 18.2	N27 58.2						
04	180 16.0	214 46.8	29.2	113 55.4	29.6	176 00.1	31.6	212 57.3	29.8	Procyon	244 52.2	N 5 09.9						
05	195 18.4	229 46.3	28.1	128 57.6	29.6	191 02.2	31.8	227 59.5	29.7									
06	210 20.9	244 45.7	S15 27.1	143 59.8	N24 29.7	206 04.2	N 0 32.0	243 01.7	S14 29.6	Rasalhague	96 00.3	N12 32.5						
07	225 23.4	259 45.1	26.1	159 02.0	29.7	221 06.3	32.1	258 03.9	29.5	Regulus	207 35.9	N11 51.2						
08	240 25.8	274 44.5	25.1	174 04.2	29.7	236 08.4	32.3	273 06.0	29.4	Rigel	281 05.2	S 8 10.6						
09	255 28.3	289 43.9	24.0	189 06.4	29.7	251 10.5	32.5	288 08.2	29.3	Rigel Kent.	139 42.6	S60 55.5						
10	270 30.8	304 43.3	23.0	204 08.5	29.8	266 12.6	32.7	303 10.4	29.2	Sabik	102 04.9	S15 45.2						
11	285 33.2	319 42.7	22.0	219 10.7	29.8	281 14.6	32.8	318 12.6	29.2									
12	300 35.7	334 42.1	S15 20.9	234 12.9	N24 29.8	296 16.7	N 0 33.0	333 14.8	S14 29.1	Schedar	349 33.1	N56 40.0						
13	315 38.1	349 41.5	19.9	249 15.1	29.8	311 18.8	33.2	348 17.0	29.0	Shaula	96 12.9	S37 07.1						
14	330 40.6	4 41.0	18.9	264 17.2	29.9	326 20.9	33.4	3 19.2	28.9	Sirius	258 27.3	S16 44.9						
15	345 43.1	19 40.4	17.8	279 19.4	29.9	341 23.0	33.5	18 21.3	28.8	Spica	158 24.0	S11 16.8						
16	0 45.5	34 39.8	16.8	294 21.6	29.9	356 25.0	33.7	33 23.5	28.7	Suhail	222 47.1	S43 31.4						
17	15 48.0	49 39.2	15.8	309 23.8	30.0	11 27.1	33.9	48 25.7	28.6									
18	30 50.5	64 38.6	S15 14.7	324 25.9	N24 30.0	26 29.2	N 0 34.1	63 27.9	S14 28.5	Vega	80 34.7	N38 48.1						
19	45 52.9	79 38.0	13.7	339 28.1	30.0	41 31.3	34.2	78 30.1	28.4	Zuben'ubi	136 57.9	S16 08.2						
20	60 55.4	94 37.4	12.7	354 30.3	30.0	56 33.4	34.4	93 32.3	28.3									
21	75 57.9	109 36.9	11.6	9 32.4	30.1	71 35.4	34.6	108 34.4	28.2									
22	91 00.3	124 36.3	10.6	24 34.6	30.1	86 37.5	34.8	123 36.6	28.1	Venus	35 56.7	h 13 40						
23	106 02.8	139 35.7	09.6	39 36.8	30.1	101 39.6	34.9	138 38.8	28.0	Mars	293 46.7	20 25						
										Jupiter	355 54.7	16 18						
										Saturn	32 49.1	13 50						
Mer.Pass. 16 00.9																		
v -0.6 d 1.0 v 2.2 d 0.0 v 2.1 d 0.2 v 2.2 d 0.1																		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	19	20	21	22
19 T H U R S D A Y	d	h																
	0	177	23.1	S20	26.1	221	17.8	3.2	S26	00.6	5.7	60.2						
	01	192	22.9		25.6	235	40.0	3.1	26	06.3	5.6	60.2						
	02	207	22.8		25.1	250	02.1	3.0	26	11.9	5.3	60.3						
	03	222	22.6		24.6	264	24.1	2.9	26	17.2	5.2	60.3						
	04	237	22.4		24.1	278	46.0	2.8	26	22.4	5.0	60.3						
	05	252	22.2		23.5	293	07.8	2.6	26	27.4	4.8	60.4						
	06	267	22.0	S20	23.0	307	29.4	2.6	S26	32.2	4.7	60.4						
	07	282	21.8		22.5	321	51.0	2.5	26	36.9	4.4	60.4						
	08	297	21.6		22.0	336	12.5	2.3	26	41.3	4.2	60.4						
	09	312	21.4		21.5	350	33.8	2.3	26	45.5	4.1	60.5						
	10	327	21.2		20.9	4	55.1	2.2	26	49.6	3.8	60.5						
	11	342	21.0		20.4	19	16.3	2.1	26	53.4	3.7	60.5						
	12	357	20.8	S20	19.9	33	37.4	2.0	S26	57.1	3.4	60.6						
	13	12	20.6		19.4	47	58.4	1.9	27	00.5	3.3	60.6						
	14	27	20.4		18.8	62	19.3	1.8	27	03.8	3.0	60.6						
	15	42	20.2		18.3	76	40.1	1.8	27	06.8	2.9	60.7						
	16	57	20.0		17.8	91	00.9	1.6	27	09.7	2.6	60.7						
	17	72	19.9		17.2	105	21.5	1.6	27	12.3	2.5	60.7						
	18	87	19.7	S20	16.7	119	42.1	1.6	S27	14.8	2.2	60.7						
	19	102	19.5		16.2	134	02.7	1.4	27	17.0	2.0	60.8						
	20	117	19.3		15.7	148	23.1	1.4	27	19.0	1.9	60.8						
	21	132	19.1		15.1	162	43.5	1.4	27	20.9	1.6	60.8						
	22	147	18.9		14.6	177	03.9	1.3	27	22.5	1.4	60.9						
	23	162	18.7		14.1	191	24.2	1.2	27	23.9	1.2	60.9						
20 F R I D A Y	00	177	18.5	S20	13.5	205	44.4	1.2	S27	25.1	1.0	60.9						
	01	192	18.3		13.0	220	04.6	1.1	27	26.1	0.7	60.9						
	02	207	18.2		12.5	234	24.7	1.1	27	26.8	0.6	61.0						
	03	222	18.0		11.9	248	44.8	1.0	27	27.4	0.3	61.0						
	04	237	17.8		11.4	263	04.8	1.0	27	27.7	0.1	61.0						
	05	252	17.6		10.9	277	24.8	1.0	27	27.8	0.1	61.0						
	06	267	17.4	S20	10.3	291	44.8	0.9	S27	27.7	0.3	61.0						
	07	282	17.2		09.8	306	04.7	0.9	27	27.4	0.5	61.1						
	08	297	17.0		09.2	320	24.6	0.9	27	26.9	0.7	61.1						
	09	312	16.8		08.7	334	44.5	0.9	27	26.2	1.0	61.1						
	10	327	16.7		08.2	349	04.4	0.9	27	25.2	1.1	61.1						
	11	342	16.5		07.6	3	24.3	0.8	27	24.1	1.4	61.2						
	12	357	16.3	S20	07.1	17	44.1	0.8	S27	22.7	1.6	61.2						
	13	12	16.1		06.5	32	03.9	0.8	27	21.1	1.9	61.2						
	14	27	15.9		06.0	46	23.7	0.9	27	19.2	2.0	61.2						
	15	42	15.7		05.5	60	43.6	0.8	27	17.2	2.3	61.2						
	16	57	15.6		04.9	75	03.4	0.8	27	14.9	2.4	61.2						
	17	72	15.4		04.4	89	23.2	0.9	27	12.5	2.7	61.3						
	18	87	15.2	S20	03.8	103	43.1	0.8	S27	09.8	2.9	61.3						
	19	102	15.0		03.3	118	02.9	0.9	27	06.9	3.2	61.3						
	20	117	14.8		02.7	132	22.8	0.8	27	03.7	3.3	61.3						
	21	132	14.6		02.2	146	42.6	1.0	27	00.4	3.6	61.3						
	22	147	14.5		01.6	161	02.6	0.9	26	56.8	3.7	61.3						
	23	162	14.3		01.1	175	22.5	0.9	26	53.1	4.0	61.4						
	21 S A T U R D A Y	00	177	14.1	S20	00.5	189	42.4	1.0	S26	49.1	4.2	61.4					
01		192	13.9		00.0	204	02.4	1.1	26	44.9	4.4	61.4						
02		207	13.7		19	59.4	218	22.5	1.0	26	40.5	4.7	61.4					
03		222	13.6		58.9	232	42.5	1.1	26	35.8	4.8	61.4						
04		237	13.4		58.3	247	02.6	1.2	26	31.0	5.1	61.4						
05		252	13.2		57.8	261	22.8	1.2	26	25.9	5.2	61.4						
06		267	13.0	S19	57.2	275	43.0	1.3	S26	20.7	5.5	61.4						
07		282	12.8		56.7	290	03.3	1.3	26	15.2	5.6	61.4						
08		297	12.7		56.1	304	23.6	1.3	26	09.6	5.9	61.4						
09		312	12.5		55.6	318	43.9	1.5	26	03.7	6.1	61.5						
10		327	12.3		55.0	333	04.4	1.5	25	57.6	6.3	61.5						
11		342	12.1		54.5	347	24.9	1.5	25	51.3	6.5	61.5						
12		357	12.0	S19	53.9	1	45.4	1.6	S25	44.8	6.7	61.5						
13		12	11.8		53.3	16	06.0	1.7	25	38.1	6.9	61.5						
14		27	11.6		52.8	30	26.7	1.8	25	31.2	7.1	61.5						
15		42	11.4		52.2	44	47.5	1.9	25	24.1	7.2	61.5						
16		57	11.3		51.7	59	08.4	1.9	25	16.9	7.5	61.5						
17		72	11.1		51.1	73	29.3	2.0	25	09.4	7.7	61.5						
18		87	10.9	S19	50.5	87	50.3	2.1	S25	01.7	7.9	61.5						
19		102	10.7		50.0	102	11.4	2.2	24	53.8	8.0	61.5						
20		117	10.6		49.4	116	32.6	2.3	24	45.8	8.3	61.5						
21		132	10.4		48.9	130	53.9	2.4	24	37.5	8.4	61.5						
22		147	10.2		48.3	145	15.3	2.4	24	29.1	8.6	61.5						
23		162	10.0		47.7	159	36.7	2.6	S24	20.5	8.8	61.5						
		SD	16.3	d	0.5	SD	16.5	16.7	16.7									



UT	ARIES			VENUS −3.9			MARS −0.5			JUPITER −2.2			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
SUNDAY	d h	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /		° /	° /				
	00	121 05.3	154 35.1	S15 08.5	54 38.9	N24 30.1	116 41.7	N 0 35.1	153 41.0	S14 27.9	Acamar	315 12.9	S40 13.0					
	01	136 07.7	169 34.5	07.5	69 41.1	30.2	131 43.8	35.3	168 43.2	27.8	Achernar	335 21.5	S57 07.5					
	02	151 10.2	184 34.0	06.4	84 43.2	30.2	146 45.8	35.5	183 45.4	27.7	Acru	173 01.6	S63 13.3					
	03	166 12.6	199 33.4	05.4	99 45.4	30.2	161 47.9	35.6	198 47.6	27.6	Adhara	255 06.8	S29 00.3					
	04	181 15.1	214 32.8	04.4	114 47.6	30.3	176 50.0	35.8	213 49.7	27.5	Aldebaran	290 41.2	N16 33.3					
	05	196 17.6	229 32.2	03.3	129 49.7	30.3	191 52.1	36.0	228 51.9	27.4								
	06	211 20.0	244 31.6	S15 02.3	144 51.9	N24 30.3	206 54.1	N 0 36.2	243 54.1	S14 27.3	Alioth	166 14.2	N55 49.8					
	07	226 22.5	259 31.1	01.2	159 54.0	30.3	221 56.2	36.4	258 56.3	27.2	Alkaid	152 53.2	N49 11.6					
	08	241 25.0	274 30.5	15 00.2	174 56.2	30.4	236 58.3	36.5	273 58.5	27.2	Alnair	27 35.3	S46 51.2					
	09	256 27.4	289 29.9	14 59.1	189 58.3	30.4	252 00.4	36.7	289 00.7	27.1	Alnilam	275 39.1	S 1 11.3					
	10	271 29.9	304 29.3	58.1	205 00.5	30.4	267 02.5	36.9	304 02.9	27.0	Alphard	217 49.0	S 8 45.5					
	11	286 32.4	319 28.8	57.0	220 02.6	30.4	282 04.5	37.1	319 05.0	26.9								
	12	301 34.8	334 28.2	S14 56.0	235 04.8	N24 30.5	297 06.6	N 0 37.2	334 07.2	S14 26.8	Alphecca	126 05.3	N26 38.0					
	13	316 37.3	349 27.6	55.0	250 06.9	30.5	312 08.7	37.4	349 09.4	26.7	Alpheratz	357 36.6	N29 13.1					
	14	331 39.8	4 27.0	53.9	265 09.1	30.5	327 10.8	37.6	4 11.6	26.6	Altair	62 01.9	N 8 55.6					
	15	346 42.2	19 26.5	52.9	280 11.2	30.6	342 12.8	37.8	19 13.8	26.5	Ankaa	353 08.9	S42 11.2					
	16	1 44.7	34 25.9	51.8	295 13.4	30.6	357 14.9	37.9	34 16.0	26.4	Antares	112 18.0	S26 28.9					
	17	16 47.1	49 25.3	50.8	310 15.5	30.6	12 17.0	38.1	49 18.1	26.3								
	18	31 49.6	64 24.8	S14 49.7	325 17.6	N24 30.7	27 19.1	N 0 38.3	64 20.3	S14 26.2	Arcturus	145 49.4	N19 03.6					
	19	46 52.1	79 24.2	48.7	340 19.8	30.7	42 21.1	38.5	79 22.5	26.1	Atria	107 14.1	S69 03.9					
	20	61 54.5	94 23.6	47.6	355 21.9	30.7	57 23.2	38.7	94 24.7	26.0	Avior	234 14.7	S59 34.9					
	21	76 57.0	109 23.1	46.5	10 24.0	30.7	72 25.3	38.8	109 26.9	25.9	Bellatrix	278 24.3	N 6 22.2					
	22	91 59.5	124 22.5	45.5	25 26.2	30.8	87 27.4	39.0	124 29.1	25.8	Betelgeuse	270 53.5	N 7 24.6					
	23	107 01.9	139 21.9	44.4	40 28.3	30.8	102 29.4	39.2	139 31.3	25.7								
MONDAY	00	122 04.4	154 21.3	S14 43.4	55 30.4	N24 30.8	117 31.5	N 0 39.4	154 33.4	S14 25.6	Canopus	263 52.6	S52 42.6					
	01	137 06.9	169 20.8	42.3	70 32.6	30.9	132 33.6	39.5	169 35.6	25.5	Capella	280 23.9	N46 01.3					
	02	152 09.3	184 20.2	41.3	85 34.7	30.9	147 35.7	39.7	184 37.8	25.4	Deneb	49 27.4	N45 21.7					
	03	167 11.8	199 19.6	40.2	100 36.8	30.9	162 37.7	39.9	199 40.0	25.3	Denebola	182 26.4	N14 26.5					
	04	182 14.3	214 19.1	39.2	115 39.0	31.0	177 39.8	40.1	214 42.2	25.2	Diphda	348 49.0	S17 51.8					
	05	197 16.7	229 18.5	38.1	130 41.1	31.0	192 41.9	40.3	229 44.4	25.1								
	06	212 19.2	244 18.0	S14 37.0	145 43.2	N24 31.0	207 43.9	N 0 40.4	244 46.5	S14 25.0	Dubhe	193 42.5	N61 37.4					
	07	227 21.6	259 17.4	36.0	160 45.3	31.1	222 46.0	40.6	259 48.7	24.9	Einath	278 03.6	N28 37.6					
	08	242 24.1	274 16.8	34.9	175 47.5	31.1	237 48.1	40.8	274 50.9	24.9	Eltanin	90 43.4	N51 28.9					
	09	257 26.6	289 16.3	33.8	190 49.6	31.1	252 50.2	41.0	289 53.1	24.8	Enif	33 40.7	N 9 58.7					
	10	272 29.0	304 15.7	32.8	205 51.7	31.1	267 52.2	41.1	304 55.3	24.7	Fomalhaut	15 16.6	S29 30.2					
	11	287 31.5	319 15.1	31.7	220 53.8	31.2	282 54.3	41.3	319 57.5	24.6								
	12	302 34.0	334 14.6	S14 30.7	235 55.9	N24 31.2	297 56.4	N 0 41.5	334 59.6	S14 24.5	Gacrux	171 53.2	S57 14.3					
	13	317 36.4	349 14.0	29.6	250 58.0	31.2	312 58.4	41.7	350 01.8	24.4	Gienah	175 45.1	S17 40.1					
	14	332 38.9	4 13.5	28.5	266 00.2	31.3	328 00.5	41.9	5 04.0	24.3	Hadar	148 38.3	S60 28.7					
	15	347 41.4	19 12.9	27.5	281 02.3	31.3	343 02.6	42.0	20 06.2	24.2	Hamal	327 53.0	N23 34.3					
	16	2 43.8	34 12.3	26.4	296 04.4	31.3	358 04.7	42.2	35 08.4	24.1	Kaus Aust.	83 35.0	S34 22.4					
	17	17 46.3	49 11.8	25.3	311 06.5	31.4	13 06.7	42.4	50 10.6	24.0								
	18	32 48.8	64 11.2	S14 24.3	326 08.6	N24 31.4	28 08.8	N 0 42.6	65 12.7	S14 23.9	Kochab	137 20.0	N74 03.3					
	19	47 51.2	79 10.7	23.2	341 10.7	31.4	43 10.9	42.8	80 14.9	23.8	Markab	13 31.7	N15 19.7					
	20	62 53.7	94 10.1	22.1	356 12.8	31.5	58 12.9	42.9	95 17.1	23.7	Menkar	314 07.7	N 4 10.7					
	21	77 56.1	109 09.6	21.1	11 14.9	31.5	73 15.0	43.1	110 19.3	23.6	Menkent	147 59.5	S36 28.8					
	22	92 58.6	124 09.0	20.0	26 17.0	31.5	88 17.1	43.3	125 21.5	23.5	Miaplacidus	221 37.7	S69 48.6					
	23	108 01.1	139 08.4	18.9	41 19.1	31.6	103 19.1	43.5	140 23.7	23.4								
	TUESDAY	00	123 03.5	154 07.9	S14 17.8	56 21.2	N24 31.6	118 21.2	N 0 43.7	155 25.8	S14 23.3	Mirfak	308 30.4	N49 56.7				
01		138 06.0	169 07.3	16.8	71 23.3	31.6	133 23.3	43.8	170 28.0	23.2	Nunki	75 50.1	S26 16.1					
02		153 08.5	184 06.8	15.7	86 25.4	31.7	148 25.4	44.0	185 30.2	23.1	Peacock	53 08.9	S56 39.7					
03		168 10.9	199 06.2	14.6	101 27.5	31.7	163 27.4	44.2	200 32.4	23.0	Pollux	243 18.9	N27 58.2					
04		183 13.4	214 05.7	13.5	116 29.6	31.7	178 29.5	44.4	215 34.6	22.9	Procyon	244 52.2	N 5 09.9					
05		198 15.9	229 05.1	12.5	131 31.7	31.8	193 31.6	44.5	230 36.8	22.8								
06		213 18.3	244 04.6	S14 11.4	146 33.8	N24 31.8	208 33.6	N 0 44.7	245 38.9	S14 22.7	Rasalhague	96 00.3	N12 32.5					
07		228 20.8	259 04.0	10.3	161 35.9	31.8	223 35.7	44.9	260 41.1	22.6	Regulus	207 35.9	N11 51.2					
08		243 23.2	274 03.5	09.2	176 38.0	31.9	238 37.8	45.1	275 43.3	22.5	Rigel	281 05.2	S 8 10.6					
09		258 25.7	289 02.9	08.2	191 40.1	31.9	253 39.8	45.3	290 45.5	22.4	Rigel Kent.	139 42.6	S60 55.5					
10		273 28.2	304 02.4	07.1	206 42.2	32.0	268 41.9	45.4	305 47.7	22.4	Sabik	102 04.9	S15 45.2					
11		288 30.6	319 01.8	06.0	221 44.3	32.0	283 44.0	45.6	320 49.9	22.3								
12		303 33.1	334 01.3	S14 04.9	236 46.4	N24 32.0	298 46.0	N 0 45.8	335 52.0	S14 22.2	Schedar	349 33.1	N56 40.0					
13		318 35.6	349 00.7	03.9	251 48.4	32.1	313 48.1	46.0	350 54.2	22.1	Shaula	96 12.9	S37 07.1					
14		333 38.0	4 00.2	02.8	266 50.5	32.1	328 50.2	46.2	5 56.4	22.0	Sirius	258 27.3	S16 44.9					
15		348 40.5	18 59.6	01.7	281 52.6	32.1	343 52.2	46.4	20 58.6	21.9	Spica	158 23.9	S11 16.9					
16		3 43.0	33 59.1	14 00.6	296 54.7	32.2	358 54.3	46.5	36 00.8	21.8	Suhail	222 47.0	S43 31.5					
17		18 45.4	48 58.5	13 59.5	311 56.8	32.2	13 56.4	46.7	51 02.9	21.7								
18		33 47.9	63 58.0	S13 58.4	326 58.9	N24 32.2	28 58.4	N 0 46.9	66 05.1	S14 21.6	Vega	80 34.7	N38 48.1					
19		48 50.4	78 57.4	57.4	342 00.9	32.3	44 00.5	47.1	81 07.3	21.5	Zuben'ubi	136 57.9	S16 08.2					
20		63 52.8	93 56.9	56.3	357 03.0	32.3	59 02.6	47.3	96 09.5	21.4								
21		78 55.3	108 56.4	55.2	12 05.1	32.3	74 04.6	47.4	111 11.7	21.3								
22		93 57.7	123 55.8	54.1	27 07.2	32.4	89 06.7	47.6	126 13.9	21.2	Venus	32 17.0	13 43					
23		109 00.2	138 55.3	53.0	42 09.2	32.4	104 08.8	47.8	141 16.0	21.1	Mars	293 26.0	20 15					
Mer. Pass. 15 49.1															Jupiter	355 27.1	16 08	
															Saturn	32 29.0	13 40	

UT	ARIES		VENUS −3.9		MARS −0.4		JUPITER −2.2		SATURN +0.8		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
WEDNESDAY	124 02.7	153 54.7 S13 51.9	57 11.3 N24 32.5	119 10.8 N 0 48.0	156 18.2 S14 21.0	Acamar	315 12.9 S40 13.0						
	01 139 05.1	168 54.2 50.8	72 13.4 32.5	134 12.9 48.2	171 20.4 20.9	Achernar	335 21.5 S57 07.5						
	02 154 07.6	183 53.6 49.7	87 15.4 32.5	149 15.0 48.3	186 22.6 20.8	Acrux	173 01.5 S63 13.3						
	03 169 10.1	198 53.1 . . 48.7	102 17.5 . . 32.6	164 17.0 . . 48.5	201 24.8 . . 20.7	Adhara	255 06.8 S29 00.3						
	04 184 12.5	213 52.6 47.6	117 19.6 32.6	179 19.1 48.7	216 26.9 20.6	Aldebaran	290 41.3 N16 33.3						
	05 199 15.0	228 52.0 46.5	132 21.7 32.6	194 21.1 48.9	231 29.1 20.5								
	06 214 17.5	243 51.5 S13 45.4	147 23.7 N24 32.7	209 23.2 N 0 49.1	246 31.3 S14 20.4	Alioth	166 14.2 N55 49.8						
	07 229 19.9	258 51.0 44.3	162 25.8 32.7	224 25.3 49.3	261 33.5 20.3	Alkaid	152 53.2 N49 11.6						
	08 244 22.4	273 50.4 43.2	177 27.8 32.8	239 27.3 49.4	276 35.7 20.2	Alnair	27 35.4 S46 51.2						
	09 259 24.8	288 49.9 . . 42.1	192 29.9 . . 32.8	254 29.4 . . 49.6	291 37.9 . . 20.1	Alnilam	275 39.1 S 1 11.3						
	10 274 27.3	303 49.3 41.0	207 32.0 32.8	269 31.5 49.8	306 40.0 20.0	Alphard	217 49.0 S 8 45.5						
	11 289 29.8	318 48.8 39.9	222 34.0 32.9	284 33.5 50.0	321 42.2 19.9								
	12 304 32.2	333 48.3 S13 38.8	237 36.1 N24 32.9	299 35.6 N 0 50.2	336 44.4 S14 19.8	Alphecca	126 05.2 N26 38.0						
	13 319 34.7	348 47.7 37.7	252 38.1 32.9	314 37.6 50.3	351 46.6 19.7	Alpheratz	357 36.6 N29 13.1						
	14 334 37.2	3 47.2 36.6	267 40.2 33.0	329 39.7 50.5	6 48.8 19.6	Altair	62 01.9 N 8 55.6						
	15 349 39.6	18 46.7 . . 35.5	282 42.2 . . 33.0	344 41.8 . . 50.7	21 50.9 . . 19.5	Ankaa	353 08.9 S42 11.2						
	16 4 42.1	33 46.1 34.4	297 44.3 33.1	359 43.8 50.9	36 53.1 19.5	Antares	112 18.0 S26 28.9						
	17 19 44.6	48 45.6 33.3	312 46.4 33.1	14 45.9 51.1	51 55.3 19.4								
	18 34 47.0	63 45.1 S13 32.2	327 48.4 N24 33.1	29 48.0 N 0 51.3	66 57.5 S14 19.3	Arcturus	145 49.4 N19 03.6						
	19 49 49.5	78 44.5 31.1	342 50.5 33.2	44 50.0 51.4	81 59.7 19.2	Atria	107 14.1 S69 03.9						
	20 64 52.0	93 44.0 30.0	357 52.5 33.2	59 52.1 51.6	97 01.9 19.1	Avior	234 14.7 S59 35.0						
	21 79 54.4	108 43.5 . . 28.9	12 54.5 . . 33.3	74 54.1 . . 51.8	112 04.0 . . 19.0	Bellatrix	278 24.4 N 6 22.2						
	22 94 56.9	123 42.9 27.8	27 56.6 33.3	89 56.2 52.0	127 06.2 18.9	Betelgeuse	270 53.5 N 7 24.6						
	23 109 59.3	138 42.4 26.7	42 58.6 33.3	104 58.3 52.2	142 08.4 18.8								
THURSDAY	125 01.8	153 41.9 S13 25.6	58 00.7 N24 33.4	120 00.3 N 0 52.4	157 10.6 S14 18.7	Canopus	263 52.6 S52 42.6						
	01 140 04.3	168 41.4 24.5	73 02.7 33.4	135 02.4 52.5	172 12.8 18.6	Capella	280 23.9 N46 01.4						
	02 155 06.7	183 40.8 23.4	88 04.8 33.5	150 04.4 52.7	187 14.9 18.5	Deneb	49 27.4 N45 21.7						
	03 170 09.2	198 40.3 . . 22.3	103 06.8 . . 33.5	165 06.5 . . 52.9	202 17.1 . . 18.4	Denebola	182 26.4 N14 26.5						
	04 185 11.7	213 39.8 21.2	118 08.8 33.5	180 08.6 53.1	217 19.3 18.3	Diphda	348 49.0 S17 51.8						
	05 200 14.1	228 39.2 20.1	133 10.9 33.6	195 10.6 53.3	232 21.5 18.2								
	06 215 16.6	243 38.7 S13 19.0	148 12.9 N24 33.6	210 12.7 N 0 53.4	247 23.7 S14 18.1	Dubhe	193 42.5 N61 37.4						
	07 230 19.1	258 38.2 17.9	163 15.0 33.7	225 14.7 53.6	262 25.8 18.0	Elnath	278 03.6 N28 37.6						
	08 245 21.5	273 37.7 16.8	178 17.0 33.7	240 16.8 53.8	277 28.0 17.9	Eltanin	90 43.4 N51 28.9						
	09 260 24.0	288 37.1 . . 15.7	193 19.0 . . 33.7	255 18.9 . . 54.0	292 30.2 . . 17.8	Enif	33 40.7 N 9 58.7						
	10 275 26.5	303 36.6 14.6	208 21.1 33.8	270 20.9 54.2	307 32.4 17.7	Fomalhaut	15 16.6 S29 30.2						
	11 290 28.9	318 36.1 13.5	223 23.1 33.8	285 23.0 54.4	322 34.6 17.6								
	12 305 31.4	333 35.6 S13 12.4	238 25.1 N24 33.9	300 25.0 N 0 54.6	337 36.7 S14 17.5	Gacrux	171 53.2 S57 14.3						
	13 320 33.8	348 35.0 11.2	253 27.1 33.9	315 27.1 54.7	352 38.9 17.4	Gienah	175 45.1 S17 40.1						
	14 335 36.3	3 34.5 10.1	268 29.2 34.0	330 29.1 54.9	7 41.1 17.3	Hadar	148 38.3 S60 28.7						
	15 350 38.8	18 34.0 . . 09.0	283 31.2 . . 34.0	345 31.2 . . 55.1	22 43.3 . . 17.2	Hamal	327 53.0 N23 34.3						
	16 5 41.2	33 33.5 07.9	298 33.2 34.0	0 33.3 55.3	37 45.5 17.1	Kaus Aust.	83 35.0 S34 22.4						
	17 20 43.7	48 33.0 06.8	313 35.2 34.1	15 35.3 55.5	52 47.7 17.0								
	18 35 46.2	63 32.4 S13 05.7	328 37.3 N24 34.1	30 37.4 N 0 55.7	67 49.8 S14 16.9	Kochab	137 20.0 N74 03.3						
	19 50 48.6	78 31.9 04.6	343 39.3 34.2	45 39.4 55.8	82 52.0 16.8	Markab	13 31.7 N15 19.7						
	20 65 51.1	93 31.4 03.5	358 41.3 34.2	60 41.5 56.0	97 54.2 16.7	Menkar	314 07.8 N 4 10.7						
	21 80 53.6	108 30.9 . . 02.3	13 43.3 . . 34.2	75 43.5 . . 56.2	112 56.4 . . 16.6	Menkent	147 59.5 S36 28.8						
	22 95 56.0	123 30.4 01.2	28 45.3 34.3	90 45.6 56.4	127 58.6 16.5	Miaplacidus	221 37.7 S69 48.6						
	23 110 58.5	138 29.9 13 00.1	43 47.4 34.3	105 47.7 56.6	143 00.7 16.4								
FRIDAY	126 00.9	153 29.3 S12 59.0	58 49.4 N24 34.4	120 49.7 N 0 56.8	158 02.9 S14 16.3	Mirfak	308 30.4 N49 56.7						
	01 141 03.4	168 28.8 57.9	73 51.4 34.4	135 51.8 56.9	173 05.1 16.2	Nunki	75 50.1 S26 16.1						
	02 156 05.9	183 28.3 56.8	88 53.4 34.5	150 53.8 57.1	188 07.3 16.1	Peacock	53 08.9 S56 39.7						
	03 171 08.3	198 27.8 . . 55.6	103 55.4 . . 34.5	165 55.9 . . 57.3	203 09.5 . . 16.0	Pollux	243 18.9 N27 58.2						
	04 186 10.8	213 27.3 54.5	118 57.4 34.5	180 57.9 57.5	218 11.6 15.9	Procyon	244 52.2 N 5 09.9						
	05 201 13.3	228 26.8 53.4	133 59.4 34.6	196 00.0 57.7	233 13.8 15.9								
	06 216 15.7	243 26.2 S12 52.3	149 01.4 N24 34.6	211 02.0 N 0 57.9	248 16.0 S14 15.8	Rasalhague	96 00.3 N12 32.5						
	07 231 18.2	258 25.7 51.2	164 03.4 34.7	226 04.1 58.1	263 18.2 15.7	Regulus	207 35.9 N11 51.2						
	08 246 20.7	273 25.2 50.0	179 05.4 34.7	241 06.2 58.2	278 20.4 15.6	Rigel	281 05.2 S 8 10.6						
	09 261 23.1	288 24.7 . . 48.9	194 07.5 . . 34.8	256 08.2 . . 58.4	293 22.5 . . 15.5	Rigel Kent.	139 42.6 S60 55.5						
	10 276 25.6	303 24.2 47.8	209 09.5 34.8	271 10.3 58.6	308 24.7 15.4	Sabik	102 04.9 S15 45.2						
	11 291 28.1	318 23.7 46.7	224 11.5 34.9	286 12.3 58.8	323 26.9 15.3								
	12 306 30.5	333 23.2 S12 45.5	239 13.5 N24 34.9	301 14.4 N 0 59.0	338 29.1 S14 15.2	Schedar	349 33.1 N56 40.0						
	13 321 33.0	348 22.7 44.4	254 15.5 34.9	316 16.4 59.2	353 31.3 15.1	Shaula	96 12.9 S37 07.1						
	14 336 35.4	3 22.1 43.3	269 17.5 35.0	331 18.5 59.4	8 33.4 15.0	Sirius	258 27.3 S16 45.0						
	15 351 37.9	18 21.6 . . 42.2	284 19.5 . . 35.0	346 20.5 . . 59.5	23 35.6 . . 14.9	Spica	158 23.9 S11 16.9						
	16 6 40.4	33 21.1 41.0	299 21.5 35.1	1 22.6 59.7	38 37.8 14.8	Suhail	222 47.0 S43 31.5						
	17 21 42.8	48 20.6 39.9	314 23.5 35.1	16 24.6 0 59.9	53 40.0 14.7								
	18 36 45.3	63 20.1 S12 38.8	329 25.4 N24 35.2	31 26.7 N 1 00.1	68 42.1 S14 14.6	Vega	80 34.7 N38 48.1						
	19 51 47.8	78 19.6 37.7	344 27.4 35.2	46 28.7 00.3	83 44.3 14.5	Zuben'ubi	136 57.9 S16 08.2						
	20 66 50.2	93 19.1 36.5	359 29.4 35.3	61 30.8 00.5	98 46.5 14.4								
	21 81 52.7	108 18.6 . . 35.4	14 31.4 . . 35.3	76 32.9 . . 00.7	113 48.7 . . 14.3								
	22 96 55.2	123 18.1 34.3	29 33.4 35.3	91 34.9 00.8	128 50.9 14.2	Venus	28 40.1 13 46						
	23 111 57.6	138 17.6 33.1	44 35.4 35.4	106 37.0 01.0	143 53.0 14.1	Mars	292 58.9 20 05						
h m											Jupiter	354 58.5 15 58	
Mer. Pass. 15 37.3											Saturn	32 08.8 13 29	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise					
										25	26		27	28				
	GHA	Dec	GHA	ν	Dec	d	HP	Naut.		Civil	h m		h m	h m	h m	h m	h m	h m
WEDNESDAY	d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	N 72	h m	h m	h m	h m	h m	h m	h m	h m	h m
	00	176 58.3	S19 04.9	132 51.1	10.6 S	7 59.6	16.2	60.0	N 70	07 31	09 06	11 45	10 36	10 02	09 28	08 46		
	01	191 58.1	04.3	147 20.7	10.8	7 43.4	16.2	59.9	68	07 20	08 43	10 22	10 29	10 03	09 38	09 08		
	02	206 58.0	03.6	161 50.5	10.8	7 27.2	16.2	59.9	66	07 11	08 25	09 44	10 23	10 04	09 46	09 25		
	03	221 57.8	03.0	176 20.3	10.9	7 11.0	16.2	59.9	64	07 04	08 10	09 18	10 18	10 05	09 53	09 39		
	04	236 57.7	02.4	190 50.2	11.0	6 54.8	16.2	59.8	62	06 58	07 58	08 58	10 14	10 06	09 59	09 51		
	05	251 57.6	01.8	205 20.2	11.1	6 38.6	16.3	59.8	60	06 52	07 48	08 41	10 10	10 07	10 04	10 01		
	06	266 57.4	S19 01.2	219 50.3	11.1 S	6 22.3	16.3	59.8	N 58	06 47	07 39	08 28	10 07	10 08	10 08	10 10		
	07	281 57.3	00.6	234 20.4	11.2	6 06.0	16.2	59.7	56	06 42	07 31	08 16	10 04	10 08	10 12	10 17		
	08	296 57.1	19 00.0	248 50.6	11.3	5 49.8	16.3	59.7	54	06 38	07 24	08 06	10 01	10 09	10 16	10 24		
	09	311 57.0	18 59.3	263 20.9	11.4	5 33.5	16.3	59.6	52	06 34	07 17	07 57	09 59	10 09	10 19	10 30		
	10	326 56.8	58.7	277 51.3	11.5	5 17.2	16.3	59.6	50	06 30	07 12	07 49	09 57	10 10	10 22	10 36		
	11	341 56.7	58.1	292 21.8	11.5	5 00.9	16.3	59.6	45	06 27	07 06	07 42	09 55	10 10	10 25	10 41		
	12	356 56.5	S18 57.5	306 52.3	11.5 S	4 44.6	16.3	59.5	N 40	06 19	06 55	07 27	09 51	10 11	10 31	10 51		
	13	11 56.4	56.9	321 22.8	11.7	4 28.3	16.3	59.5	35	06 12	06 45	07 14	09 47	10 12	10 36	11 00		
	14	26 56.3	56.3	335 53.5	11.7	4 12.0	16.3	59.4	30	06 05	06 36	07 03	09 44	10 12	10 40	11 08		
	15	41 56.1	55.6	350 24.2	11.8	3 55.7	16.3	59.4	20	05 59	06 28	06 54	09 41	10 13	10 44	11 15		
	16	56 56.0	55.0	4 55.0	11.8	3 39.4	16.3	59.4	N 10	05 47	06 14	06 37	09 36	10 14	10 50	11 27		
	17	71 55.8	54.4	19 25.8	11.9	3 23.1	16.3	59.3	0	05 35	06 00	06 23	09 32	10 15	10 56	11 38		
	18	86 55.7	S18 53.8	33 56.7	12.0 S	3 06.8	16.3	59.3	S 10	05 22	05 47	06 09	09 28	10 16	11 02	11 48		
	19	101 55.5	53.2	48 27.7	12.0	2 50.5	16.2	59.3	20	05 07	05 33	05 55	09 24	10 17	11 08	11 58		
	20	116 55.4	52.5	62 58.7	12.1	2 34.3	16.3	59.2	30	04 49	05 17	05 40	09 20	10 18	11 14	12 09		
	21	131 55.3	51.9	77 29.8	12.1	2 18.0	16.2	59.2	35	04 25	04 57	05 23	09 15	10 19	11 21	12 21		
	22	146 55.1	51.3	92 00.9	12.2	2 01.8	16.3	59.1	40	04 11	04 45	05 13	09 12	10 20	11 25	12 28		
	23	161 55.0	50.7	106 32.1	12.3	1 45.5	16.2	59.1	45	03 53	04 31	05 01	09 09	10 20	11 29	12 37		
THURSDAY	00	176 54.8	S18 50.1	121 03.4	12.3 S	1 29.3	16.2	59.1	S 50	03 30	04 13	04 48	09 05	10 21	11 35	12 46		
	01	191 54.7	49.4	135 34.7	12.3	1 13.1	16.2	59.0	52	02 59	03 51	04 31	09 01	10 23	11 41	12 58		
	02	206 54.6	48.8	150 06.0	12.4	0 56.9	16.2	59.0	54	02 43	03 41	04 23	08 59	10 23	11 44	13 04		
	03	221 54.4	48.2	164 37.4	12.5	0 40.7	16.2	58.9	56	02 23	03 28	04 14	08 57	10 24	11 48	13 10		
	04	236 54.3	47.5	179 08.9	12.4	0 24.5	16.1	58.9	58	02 07	03 14	04 04	08 54	10 24	11 51	13 17		
	05	251 54.1	46.9	193 40.3	12.6 S	0 08.4	16.1	58.9	S 60	01 17	02 57	03 52	08 51	10 25	11 55	13 24		
	06	266 54.0	S18 46.3	208 11.9	12.6 N	0 07.7	16.1	58.8	Twilight		Moonset							
	07	281 53.9	45.7	222 43.5	12.6	0 23.8	16.1	58.8	Lat.	Sunset	Civil	Naut.	25	26	27	28		
	08	296 53.7	45.0	237 15.1	12.6	0 39.9	16.0	58.7										
	09	311 53.6	44.4	251 46.7	12.8	0 55.9	16.0	58.7										
	10	326 53.5	43.8	266 18.5	12.7	1 11.9	16.0	58.7										
	11	341 53.3	43.1	280 50.2	12.8	1 27.9	15.9	58.6	N 72	h m	h m	h m	h m	h m	h m	h m	h m	
	12	356 53.2	S18 42.5	295 22.0	12.8 N	1 43.8	16.0	58.6	N 70	12 41	15 20	16 56	21 22	23 38	25 58	01 58		
	13	11 53.1	41.9	309 53.8	12.8	1 59.8	15.9	58.5	68	14 04	15 43	17 06	21 25	23 31	25 38	01 38		
	14	26 52.9	41.3	324 25.6	12.9	2 15.7	15.8	58.5	66	14 42	16 01	17 15	21 28	23 26	25 23	01 23		
	15	41 52.8	40.6	338 57.5	12.9	2 31.5	15.8	58.5	64	15 08	16 16	17 22	21 30	23 21	25 11	01 11		
	16	56 52.6	40.0	353 29.4	13.0	2 47.3	15.8	58.4	62	15 28	16 28	17 28	21 32	23 17	25 00	01 00		
	17	71 52.5	39.4	8 01.4	13.0	3 03.1	15.8	58.4	60	15 44	16 38	17 34	21 34	23 14	24 52	00 52		
	18	86 52.4	S18 38.7	22 33.4	13.0 N	3 18.9	15.7	58.3	N 58	15 58	16 47	17 39	21 35	23 11	24 44	00 44		
	19	101 52.2	38.1	37 05.4	13.0	3 34.6	15.7	58.3	56	16 09	16 55	17 44	21 36	23 08	24 38	00 38		
	20	116 52.1	37.4	51 37.4	13.0	3 50.3	15.6	58.3	54	16 19	17 02	17 48	21 37	23 06	24 32	00 32		
	21	131 52.0	36.8	66 09.4	13.1	4 05.9	15.6	58.2	52	16 28	17 08	17 52	21 39	23 04	24 27	00 27		
	22	146 51.9	36.2	80 41.5	13.1	4 21.5	15.5	58.2	50	16 36	17 14	17 55	21 39	23 02	24 22	00 22		
	23	161 51.7	35.5	95 13.6	13.1	4 37.0	15.5	58.1	45	16 44	17 19	17 59	21 40	23 00	24 18	00 18		
	FRIDAY	00	176 51.6	S18 34.9	109 45.7	13.2 N	4 52.5	15.5	58.1	N 40	16 59	17 31	18 06	21 42	22 57	24 09	00 09	
01		191 51.5	34.3	124 17.9	13.1	5 08.0	15.4	58.0	35	17 11	17 41	18 13	21 44	22 54	24 02	00 02		
02		206 51.3	33.6	138 50.0	13.2	5 23.4	15.4	58.0	30	17 22	17 49	18 20	21 45	22 51	23 55	24 58		
03		221 51.2	33.0	153 22.2	13.2	5 38.8	15.3	58.0	20	17 32	17 57	18 26	21 46	22 49	23 50	24 50		
04		236 51.1	32.3	167 54.4	13.2	5 54.1	15.3	57.9	N 10	17 48	18 11	18 38	21 48	22 45	23 40	24 35		
05		251 50.9	31.7	182 26.6	13.2	6 09.4	15.2	57.9	0	18 02	18 25	18 50	21 50	22 41	23 32	24 22		
06		266 50.8	S18 31.1	196 58.8	13.3 N	6 24.6	15.1	57.9	S 10	18 16	18 38	19 03	21 51	22 38	23 24	24 10		
07		281 50.7	30.4	211 31.1	13.2	6 39.7	15.2	57.8	20	18 30	18 52	19 18	21 53	22 35	23 16	23 58		
08		296 50.5	29.8	226 03.3	13.3	6 54.9	15.0	57.8	30	18 44	19 08	19 36	21 54	22 31	23 08	23 45		
09		311 50.4	29.1	240 35.6	13.3	7 09.9	15.0	57.7	35	19 02	19 28	19 59	21 56	22 27	22 58	23 30		
10		326 50.3	28.5	255 07.9	13.2	7 24.9	15.0	57.7	40	19 12	19 40	20 14	21 57	22 25	22 53	23 22		
11		341 50.2	27.8	269 40.1	13.3	7 39.9	14.9	57.7	45	19 23	19 54	20 31	21 58	22 22	22 47	23 12		
12		356 50.0	S18 27.2	284 12.4	13.3 N	7 54.8	14.8	57.6	S 50	19 37	20 11	20 54	21 59	22 19	22 39	23 01		
13		11 49.9	26.6	298 44.7	13.3	8 09.6	14.8	57.6	52	19 53	20 32	21 24	22 01	22 16	22 31	22 48		
14		26 49.8	25.9	313 17.0	13.3	8 24.4	14.8	57.5	54	20 01	20 43	21 40	22 01	22 14	22 27	22 42		
15		41 49.7	25.3	327 49.3	13.3	8 39.2	14.6	57.5	56	20 10	20 55	22 00	22 02	22 12	22 23	22 35		
16		56 49.5	24.6	342 21.6	13.3	8 53.8	14.6	57.5	58	20 20	21 09	22 25	22 03	22 10	22 18	22 27		
17		71 49.4	24.0	356 53.9	13.3	9												

UT	ARIES			VENUS −3.9			MARS −0.3			JUPITER −2.2			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	GHA	Dec	GHA	GHA	Dec	GHA	GHA	Dec	GHA	GHA	Dec	Name	SHA	Dec
d h	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "		° / ' / "	° / ' / "
SATURDAY	28 00	127 00.1	153 17.1	S12 32.0	59 37.4	N24 35.4	121 39.0	N 1 01.2	158 55.2	S14 14.0	Acamar	315 12.9	S40 13.0					
	01	142 02.5	168 16.6	30.9	74 39.4	35.5	136 41.1	01.4	173 57.4	13.9	Achernar	335 21.5	S57 07.5					
	02	157 05.0	183 16.1	29.7	89 41.4	35.5	151 43.1	01.6	188 59.6	13.8	Acrux	173 01.5	S63 13.3					
	03	172 07.5	198 15.6	28.6	104 43.3	35.6	166 45.2	01.8	204 01.8	13.7	Adhara	255 06.8	S29 00.3					
	04	187 09.9	213 15.1	27.5	119 45.3	35.6	181 47.2	02.0	219 03.9	13.6	Aldebaran	290 41.3	N16 33.3					
	05	202 12.4	228 14.6	26.3	134 47.3	35.7	196 49.3	02.1	234 06.1	13.5								
	06	217 14.9	243 14.1	S12 25.2	149 49.3	N24 35.7	211 51.3	N 1 02.3	249 08.3	S14 13.4	Alioth	166 14.1	N55 49.8					
	07	232 17.3	258 13.6	24.1	164 51.3	35.8	226 53.4	02.5	264 10.5	13.3	Alkaid	152 53.2	N49 11.6					
	08	247 19.8	273 13.1	22.9	179 53.2	35.8	241 55.4	02.7	279 12.7	13.2	Alnair	27 35.4	S46 51.2					
	09	262 22.3	288 12.6	21.8	194 55.2	35.8	256 57.5	02.9	294 14.8	13.1	Alnilam	275 39.1	S 1 11.3					
	10	277 24.7	303 12.1	20.7	209 57.2	35.9	271 59.5	03.1	309 17.0	13.0	Alphard	217 49.0	S 8 45.5					
	11	292 27.2	318 11.6	19.5	224 59.2	35.9	287 01.6	03.3	324 19.2	12.9								
	12	307 29.7	333 11.1	S12 18.4	240 01.1	N24 36.0	302 03.6	N 1 03.5	339 21.4	S14 12.8	Alphecca	126 05.2	N26 38.0					
	13	322 32.1	348 10.6	17.2	255 03.1	36.0	317 05.7	03.6	354 23.6	12.7	Alpheratz	357 36.6	N29 13.1					
	14	337 34.6	3 10.1	16.1	270 05.1	36.1	332 07.7	03.8	9 25.7	12.6	Altair	62 01.8	N 8 55.6					
	15	352 37.0	18 09.6	15.0	285 07.1	36.1	347 09.8	04.0	24 27.9	12.5	Ankaa	353 08.9	S42 11.1					
	16	7 39.5	33 09.1	13.8	300 09.0	36.2	2 11.8	04.2	39 30.1	12.4	Antares	112 18.0	S26 28.9					
	17	22 42.0	48 08.6	12.7	315 11.0	36.2	17 13.9	04.4	54 32.3	12.3								
	18	37 44.4	63 08.1	S12 11.5	330 13.0	N24 36.3	32 15.9	N 1 04.6	69 34.4	S14 12.2	Arcturus	145 49.4	N19 03.6					
	19	52 46.9	78 07.6	10.4	345 14.9	36.3	47 18.0	04.8	84 36.6	12.1	Atria	107 14.0	S69 03.9					
	20	67 49.4	93 07.1	09.3	0 16.9	36.4	62 20.0	05.0	99 38.8	12.0	Avior	234 14.7	S59 35.0					
	21	82 51.8	108 06.6	08.1	15 18.9	36.4	77 22.1	05.1	114 41.0	11.9	Bellatrix	278 24.4	N 6 22.2					
	22	97 54.3	123 06.1	07.0	30 20.8	36.5	92 24.1	05.3	129 43.2	11.8	Betelgeuse	270 53.6	N 7 24.6					
	23	112 56.8	138 05.6	05.8	45 22.8	36.5	107 26.1	05.5	144 45.3	11.7								
SUNDAY	29 00	127 59.2	153 05.1	S12 04.7	60 24.7	N24 36.6	122 28.2	N 1 05.7	159 47.5	S14 11.6	Canopus	263 52.6	S52 42.6					
	01	143 01.7	168 04.6	03.5	75 26.7	36.6	137 30.2	05.9	174 49.7	11.5	Capella	280 23.9	N46 01.4					
	02	158 04.2	183 04.1	02.4	90 28.7	36.7	152 32.3	06.1	189 51.9	11.4	Deneb	49 27.4	N45 21.6					
	03	173 06.6	198 03.6	01.2	105 30.6	36.7	167 34.3	06.3	204 54.1	11.3	Denebola	182 26.4	N14 26.5					
	04	188 09.1	213 03.1	12 00.1	120 32.6	36.8	182 36.4	06.5	219 56.2	11.2	Diphda	348 49.1	S17 51.8					
	05	203 11.5	228 02.7	11 59.0	135 34.5	36.8	197 38.4	06.6	234 58.4	11.1								
	06	218 14.0	243 02.2	S11 57.8	150 36.5	N24 36.9	212 40.5	N 1 06.8	250 00.6	S14 11.0	Dubhe	193 42.4	N61 37.4					
	07	233 16.5	258 01.7	56.7	165 38.4	36.9	227 42.5	07.0	265 02.8	11.0	Elnath	278 03.6	N28 37.6					
	08	248 18.9	273 01.2	55.5	180 40.4	36.9	242 44.6	07.2	280 04.9	10.9	Eltanin	90 43.3	N51 28.9					
	09	263 21.4	288 00.7	54.4	195 42.3	37.0	257 46.6	07.4	295 07.1	10.8	Enif	33 40.7	N 9 58.7					
	10	278 23.9	303 00.2	53.2	210 44.3	37.0	272 48.7	07.6	310 09.3	10.7	Fomalhaut	15 16.6	S29 30.2					
	11	293 26.3	317 59.7	52.1	225 46.2	37.1	287 50.7	07.8	325 11.5	10.6								
	12	308 28.8	332 59.2	S11 50.9	240 48.2	N24 37.1	302 52.8	N 1 08.0	340 13.7	S14 10.5	Gacrux	171 53.1	S57 14.3					
	13	323 31.3	347 58.7	49.8	255 50.1	37.2	317 54.8	08.2	355 15.8	10.4	Gienah	175 45.0	S17 40.1					
	14	338 33.7	2 58.3	48.6	270 52.1	37.2	332 56.8	08.3	10 18.0	10.3	Hadar	148 38.2	S60 28.7					
	15	353 36.2	17 57.8	47.4	285 54.0	37.3	347 58.9	08.5	25 20.2	10.2	Hamal	327 53.0	N23 34.3					
	16	8 38.7	32 57.3	46.3	300 56.0	37.3	3 00.9	08.7	40 22.4	10.1	Kaus Aust.	83 35.0	S34 22.4					
	17	23 41.1	47 56.8	45.1	315 57.9	37.4	18 03.0	08.9	55 24.5	10.0								
	18	38 43.6	62 56.3	S11 44.0	330 59.8	N24 37.4	33 05.0	N 1 09.1	70 26.7	S14 09.9	Kochab	137 19.9	N74 03.3					
	19	53 46.0	77 55.8	42.8	346 01.8	37.5	48 07.1	09.3	85 28.9	09.8	Markab	13 31.8	N15 19.7					
	20	68 48.5	92 55.4	41.7	1 03.7	37.5	63 09.1	09.5	100 31.1	09.7	Menkar	314 07.8	N 4 10.7					
	21	83 51.0	107 54.9	40.5	16 05.7	37.6	78 11.2	09.7	115 33.3	09.6	Menkent	147 59.5	S36 28.8					
	22	98 53.4	122 54.4	39.4	31 07.6	37.6	93 13.2	09.9	130 35.4	09.5	Miaplacidus	221 37.7	S69 48.6					
	23	113 55.9	137 53.9	38.2	46 09.5	37.7	108 15.2	10.0	145 37.6	09.4								
MONDAY	30 00	128 58.4	152 53.4	S11 37.0	61 11.5	N24 37.7	123 17.3	N 1 10.2	160 39.8	S14 09.3	Mirfak	308 30.4	N49 56.7					
	01	144 00.8	167 52.9	35.9	76 13.4	37.8	138 19.3	10.4	175 42.0	09.2	Nunki	75 50.1	S26 16.1					
	02	159 03.3	182 52.5	34.7	91 15.3	37.8	153 21.4	10.6	190 44.1	09.1	Peacock	53 08.8	S56 39.7					
	03	174 05.8	197 52.0	33.6	106 17.3	37.9	168 23.4	10.8	205 46.3	09.0	Pollux	243 18.9	N27 58.2					
	04	189 08.2	212 51.5	32.4	121 19.2	37.9	183 25.5	11.0	220 48.5	08.9	Procyon	244 52.2	N 5 09.9					
	05	204 10.7	227 51.0	31.3	136 21.1	38.0	198 27.5	11.2	235 50.7	08.8								
	06	219 13.1	242 50.5	S11 30.1	151 23.1	N24 38.1	213 29.5	N 1 11.4	250 52.9	S14 08.7	Rasalhague	96 00.3	N12 32.4					
	07	234 15.6	257 50.1	28.9	166 25.0	38.1	228 31.6	11.6	265 55.0	08.6	Regulus	207 35.8	N11 51.2					
	08	249 18.1	272 49.6	27.8	181 26.9	38.2	243 33.6	11.8	280 57.2	08.5	Rigel	281 05.2	S 8 10.6					
	09	264 20.5	287 49.1	26.6	196 28.8	38.2	258 35.7	11.9	295 59.4	08.4	Rigel Kent.	139 42.5	S60 55.5					
	10	279 23.0	302 48.6	25.4	211 30.8	38.3	273 37.7	12.1	311 01.6	08.3	Sabik	102 04.8	S15 45.2					
	11	294 25.5	317 48.2	24.3	226 32.7	38.3	288 39.8	12.3	326 03.7	08.2								
	12	309 27.9	332 47.7	S11 23.1	241 34.6	N24 38.4	303 41.8	N 1 12.5	341 05.9	S14 08.1	Schedar	349 33.1	N56 40.0					
	13	324 30.4	347 47.2	22.0	256 36.5	38.4	318 43.8	12.7	356 08.1	08.0	Shaula	96 12.8	S37 07.1					
	14	339 32.9	2 46.7	20.8	271 38.4	38.5	333 45.9	12.9	11 10.3	07.9	Sirius	258 27.3	S16 45.0					
	15	354 35.3	17 46.3	19.6	286 40.4	38.5	348 47.9	13.1	26 12.5	07.8	Spica	158 23.9	S11 16.9					
	16	9 37.8	32 45.8	18.5	301 42.3	38.6	3 50.0	13.3	41 14.6	07.7	Suhail	222 47.0	S43 31.5					
	17	24 40.3	47 45.3	17.														

UT	SUN			MOON				Lat.	Twilight		Sunrise	Moonrise											
	GHA	Dec		GHA	v	Dec	d		HP	Naut.		Civil	28	29	30	31							
d h	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m							
28	00	176	48.5	S18	19.4	98	40.0	13.2	N10	48.9	14.1	57.2	N 72	07 21	08 53	10 58	08 46	07 22					
	01	191	48.4		18.8	113	12.2	13.3	11	03.0	14.0	57.1	N 70	07 12	08 32	10 04	09 08	08 22					
	02	206	48.3		18.1	127	44.5	13.2	11	17.0	14.0	57.1	66	06 57	08 02	09 08	09 39	09 22	08 55				
	03	221	48.2		17.5	142	16.7	13.3	11	31.0	13.9	57.0	64	06 51	07 51	08 49	09 51	09 42	09 31	09 11			
	04	236	48.1		16.8	156	49.0	13.2	11	44.9	13.8	57.0	62	06 46	07 41	08 34	10 01	09 59	09 57	09 57			
SATURDAY	05	251	47.9		16.1	171	21.2	13.2	11	58.7	13.7	57.0	60	06 42	07 33	08 21	10 10	10 12	10 17	10 27			
	06	266	47.8	S18	15.5	185	53.4	13.3	N12	12.4	13.7	56.9	N 58	06 38	07 26	08 10	10 17	10 24	10 34	10 50			
	07	281	47.7		14.8	200	25.7	13.2	12	26.1	13.6	56.9	56	06 34	07 19	08 01	10 24	10 34	10 48	11 09			
	08	296	47.6		14.2	214	57.9	13.1	12	39.7	13.5	56.9	54	06 30	07 13	07 52	10 30	10 43	11 01	11 24			
	09	311	47.5		13.5	229	30.0	13.2	12	53.2	13.4	56.8	52	06 27	07 08	07 45	10 36	10 52	11 12	11 38			
	10	326	47.3		12.9	244	02.2	13.2	13	06.6	13.4	56.8	50	06 24	07 03	07 38	10 41	10 59	11 21	11 50			
	11	341	47.2		12.2	258	34.4	13.1	13	20.0	13.3	56.8	45	06 17	06 52	07 24	10 51	11 15	11 42	12 15			
	12	356	47.1	S18	11.5	273	06.5	13.1	N13	33.3	13.2	56.7	N 40	06 10	06 43	07 11	11 00	11 28	11 59	12 35			
	13	11	47.0		10.9	287	38.6	13.1	13	46.5	13.1	56.7	35	06 04	06 34	07 01	11 08	11 39	12 13	12 51			
	14	26	46.9		10.2	302	10.7	13.1	13	59.6	13.1	56.6	30	05 58	06 27	06 52	11 15	11 48	12 25	13 06			
	15	41	46.7		09.6	316	42.8	13.0	14	12.7	13.0	56.6	20	05 47	06 13	06 36	11 27	12 05	12 46	13 30			
	16	56	46.6		08.9	331	14.8	13.0	14	25.7	12.9	56.6	N 10	05 35	06 01	06 23	11 38	12 20	13 05	13 52			
	17	71	46.5		08.2	345	46.8	13.1	14	38.6	12.8	56.5	0	05 22	05 48	06 09	11 48	12 34	13 22	14 12			
	18	86	46.4	S18	07.6	0	18.9	12.9	N14	51.4	12.7	56.5	S 10	05 08	05 34	05 56	11 58	12 48	13 40	14 32			
	19	101	46.3		06.9	14	50.8	13.0	15	04.1	12.7	56.5	20	04 51	05 19	05 42	12 09	13 03	13 58	14 53			
	20	116	46.2		06.2	29	22.8	12.9	15	16.8	12.5	56.4	30	04 29	05 00	05 26	12 21	13 21	14 20	15 18			
	21	131	46.0		05.6	43	54.7	12.9	15	29.3	12.5	56.4	35	04 14	04 48	05 16	12 28	13 31	14 33	15 33			
	22	146	45.9		04.9	58	26.6	12.9	15	41.8	12.4	56.4	40	03 57	04 35	05 05	12 37	13 43	14 48	15 51			
	23	161	45.8		04.3	72	58.5	12.9	15	54.2	12.3	56.3	45	03 35	04 18	04 52	12 46	13 57	15 06	16 11			
	29	00	176	45.7	S18	03.6	87	30.4	12.8	N16	06.5	12.2	56.3	S 50	03 06	03 57	04 36	12 58	14 14	15 28	16 38		
		01	191	45.6		02.9	102	02.2	12.8	16	18.7	12.2	56.3	52	02 51	03 47	04 28	13 04	14 22	15 38	16 50		
		02	206	45.5		02.3	116	34.0	12.8	16	30.9	12.0	56.2	54	02 33	03 35	04 20	13 10	14 31	15 50	17 05		
		03	221	45.4		01.6	131	05.8	12.7	16	42.9	12.0	56.2	56	02 09	03 22	04 10	13 17	14 41	16 04	17 22		
04		236	45.3		00.9	145	37.5	12.7	16	54.9	11.8	56.2	58	01 37	03 06	04 00	13 24	14 53	16 20	17 43			
SUNDAY	05	251	45.1	18	00.3	160	09.2	12.7	17	06.7	11.8	56.1	S 60	////	02 47	03 47	13 33	15 06	16 40	18 10			
	06	266	45.0	S17	59.6	174	40.9	12.7	N17	18.5	11.7	56.1											
	07	281	44.9		58.9	189	12.6	12.6	17	30.2	11.6	56.1	Lat.	Sunset	Twilight		Moonset						
	08	296	44.8		58.2	203	44.2	12.6	17	41.8	11.5	56.0			Civil	Naut.	28	29	30	31			
	09	311	44.7		57.6	218	15.8	12.5	17	53.3	11.4	56.0											
	10	326	44.6		56.9	232	47.3	12.6	18	04.7	11.3	56.0											
	11	341	44.5		56.2	247	18.9	12.4	18	16.0	11.2	56.0	N 72	13 29	15 35	17 07	01 58	05 00					
	12	356	44.4	S17	55.6	261	50.3	12.5	N18	27.2	11.1	55.9	N 70	14 23	15 55	17 16	01 38	04 02					
	13	11	44.3		54.9	276	21.8	12.4	18	38.3	11.1	55.9	68	14 56	16 12	17 23	01 23	03 28	06 15				
	14	26	44.1		54.2	290	53.2	12.4	18	49.4	10.9	55.9	66	15 19	16 25	17 30	01 11	03 04	05 10				
	15	41	44.0		53.5	305	24.6	12.3	19	00.3	10.8	55.8	64	15 38	16 36	17 36	01 00	02 45	04 35	06 38			
	16	56	43.9		52.9	319	55.9	12.3	19	11.1	10.7	55.8	62	15 53	16 46	17 41	00 52	02 30	04 10	05 52			
	17	71	43.8		52.2	334	27.2	12.3	19	21.8	10.7	55.8	60	16 06	16 54	17 45	00 44	02 17	03 51	05 23			
	18	86	43.7	S17	51.5	348	58.5	12.2	N19	32.5	10.5	55.7	N 58	16 16	17 01	17 49	00 38	02 06	03 35	05 00			
	19	101	43.6		50.8	3	29.7	12.2	19	43.0	10.4	55.7	56	16 26	17 08	17 53	00 32	01 57	03 21	04 42			
	20	116	43.5		50.2	18	00.9	12.2	19	53.4	10.4	55.7	54	16 34	17 14	17 57	00 27	01 49	03 09	04 27			
	21	131	43.4		49.5	32	32.1	12.1	20	03.8	10.2	55.7	52	16 42	17 19	18 00	00 22	01 41	02 59	04 13			
	22	146	43.3		48.8	47	03.2	12.1	20	14.0	10.1	55.6	50	16 49	17 24	18 03	00 18	01 34	02 49	04 02			
	23	161	43.2		48.1	61	34.3	12.0	20	24.1	10.0	55.6	45	17 03	17 35	18 10	00 09	01 20	02 30	03 38			
	30	00	176	43.1	S17	47.4	76	05.3	12.0	N20	34.1	9.9	55.6	N 40	17 15	17 44	18 16	00 02	01 08	02 14	03 18		
		01	191	43.0		46.8	90	36.3	12.0	20	44.0	9.9	55.6	35	17 25	17 52	18 23	24 58	00 58	02 01	03 02		
		02	206	42.9		46.1	105	07.3	11.9	20	53.9	9.7	55.5	30	17 34	18 00	18 28	24 50	00 50	01 49	02 48		
		03	221	42.8		45.4	119	38.2	11.9	21	03.6	9.6	55.5	20	17 50	18 13	18 40	24 35	00 35	01 30	02 25		
04		236	42.7		44.7	134	09.1	11.9	21	13.2	9.5	55.5	N 10	18 04	18 26	18 51	24 22	00 22	01 13	02 05			
MONDAY	05	251	42.6		44.0	148	40.0	11.8	21	22.7	9.3	55.4	0	18 17	18 38	19 04	24 10	00 10	00 57	01 46			
	06	266	42.5	S17	43.4	163	10.8	11.7	N21	32.0	9.3	55.4	S 10	18 30	18 52	19 18	23 58	24 41	00 41	01 27			
	07	281	42.3		42.7	177	41.5	11.8	21	41.3	9.2	55.4	20	18 44	19 07	19 35	23 45	24 24	00 24	01 07			
	08	296	42.2		42.0	192	12.3	11.7															

2023 JAN. 31, FEB. 1, 2 (TUES., WED., THURS.)															
UT		ARIES		VENUS −3.9		MARS −0.3		JUPITER −2.2		SATURN +0.8		STARS			
d	h	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
		° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /
TUESDAY	31 00	129 57.5	152 42.0	S11 09.1	61 57.6	N24 39.0	124 06.3	N 1 14.8	161 32.0	S14 06.9	Acamar	315 12.9	S40 13.0		
	01	145 00.0	167 41.5	07.9	76 59.5	39.0	139 08.3	15.0	176 34.2	06.8	Achernar	335 21.5	S57 07.5		
	02	160 02.4	182 41.1	06.8	92 01.4	39.1	154 10.4	15.2	191 36.4	06.7	Acrux	173 01.4	S63 13.4		
	03	175 04.9	197 40.6	. . 05.6	107 03.3	. . 39.1	169 12.4	. . 15.4	206 38.6	. . 06.6	Adhara	255 06.8	S29 00.3		
	04	190 07.4	212 40.1	04.4	122 05.2	39.2	184 14.4	15.6	221 40.8	06.5	Aldebaran	290 41.3	N16 33.3		
	05	205 09.8	227 39.7	03.3	137 07.1	39.3	199 16.5	15.8	236 42.9	06.4					
	06	220 12.3	242 39.2	S11 02.1	152 09.0	N24 39.3	214 18.5	N 1 16.0	251 45.1	S14 06.3	Alioth	166 14.1	N55 49.8		
	07	235 14.8	257 38.7	11 00.9	167 10.9	39.4	229 20.6	16.1	266 47.3	06.2	Alkaid	152 53.2	N49 11.6		
	08	250 17.2	272 38.3	10 59.7	182 12.8	39.4	244 22.6	16.3	281 49.5	06.1	Alnair	27 35.4	S46 51.2		
	09	265 19.7	287 37.8	. . 58.6	197 14.7	. . 39.5	259 24.6	. . 16.5	296 51.6	. . 06.0	Alnilam	275 39.1	S 1 11.3		
	10	280 22.1	302 37.3	57.4	212 16.6	39.5	274 26.7	16.7	311 53.8	05.9	Alphard	217 49.0	S 8 45.5		
	11	295 24.6	317 36.9	56.2	227 18.5	39.6	289 28.7	16.9	326 56.0	05.8					
	12	310 27.1	332 36.4	S10 55.0	242 20.4	N24 39.6	304 30.7	N 1 17.1	341 58.2	S14 05.7	Alphecca	126 05.2	N26 38.0		
	13	325 29.5	347 35.9	53.9	257 22.3	39.7	319 32.8	17.3	357 00.3	05.6	Alpheratz	357 36.6	N29 13.1		
	14	340 32.0	2 35.5	52.7	272 24.2	39.7	334 34.8	17.5	12 02.5	05.5	Altair	62 01.8	N 8 55.6		
	15	355 34.5	17 35.0	. . 51.5	287 26.1	. . 39.8	349 36.9	. . 17.7	27 04.7	. . 05.4	Ankaa	353 09.0	S42 11.1		
	16	10 36.9	32 34.6	50.3	302 28.0	39.8	4 38.9	17.9	42 06.9	05.3	Antares	112 18.0	S26 28.9		
	17	25 39.4	47 34.1	49.1	317 29.8	39.9	19 40.9	18.1	57 09.0	05.2					
	18	40 41.9	62 33.6	S10 48.0	332 31.7	N24 40.0	34 43.0	N 1 18.3	72 11.2	S14 05.1	Arcturus	145 49.3	N19 03.6		
	19	55 44.3	77 33.2	46.8	347 33.6	40.0	49 45.0	18.4	87 13.4	05.0	Atria	107 14.0	S69 03.9		
	20	70 46.8	92 32.7	45.6	2 35.5	40.1	64 47.0	18.6	102 15.6	04.9	Avior	234 14.7	S59 35.0		
	21	85 49.3	107 32.3	. . 44.4	17 37.4	. . 40.1	79 49.1	. . 18.8	117 17.8	. . 04.8	Bellatrix	278 24.4	N 6 22.2		
	22	100 51.7	122 31.8	43.2	32 39.3	40.2	94 51.1	19.0	132 19.9	04.7	Betelgeuse	270 53.6	N 7 24.6		
23	115 54.2	137 31.3	42.1	47 41.2	40.2	109 53.1	19.2	147 22.1	04.6						
WEDNESDAY	1 00	130 56.6	152 30.9	S10 40.9	62 43.0	N24 40.3	124 55.2	N 1 19.4	162 24.3	S14 04.5	Canopus	263 52.6	S52 42.6		
	01	145 59.1	167 30.4	39.7	77 44.9	40.3	139 57.2	19.6	177 26.5	04.4	Capella	280 23.9	N46 01.4		
	02	161 01.6	182 30.0	38.5	92 46.8	40.4	154 59.3	19.8	192 28.6	04.3	Deneb	49 27.4	N45 21.6		
	03	176 04.0	197 29.5	. . 37.3	107 48.7	. . 40.5	170 01.3	. . 20.0	207 30.8	. . 04.2	Denebola	182 26.3	N14 26.5		
	04	191 06.5	212 29.0	36.2	122 50.6	40.5	185 03.3	20.2	222 33.0	04.1	Diphda	348 49.1	S17 51.8		
	05	206 09.0	227 28.6	35.0	137 52.4	40.6	200 05.4	20.4	237 35.2	04.0					
	06	221 11.4	242 28.1	S10 33.8	152 54.3	N24 40.6	215 07.4	N 1 20.6	252 37.3	S14 03.9	Dubhe	193 42.4	N61 37.4		
	07	236 13.9	257 27.7	32.6	167 56.2	40.7	230 09.4	20.8	267 39.5	03.8	Elnath	278 03.6	N28 37.6		
	08	251 16.4	272 27.2	31.4	182 58.1	40.7	245 11.5	21.0	282 41.7	03.7	Eltanin	90 43.3	N51 28.9		
	09	266 18.8	287 26.8	. . 30.2	197 59.9	. . 40.8	260 13.5	. . 21.1	297 43.9	. . 03.6	Enif	33 40.7	N 9 58.7		
	10	281 21.3	302 26.3	29.0	213 01.8	40.8	275 15.5	21.3	312 46.0	03.5	Fomalhaut	15 16.6	S29 30.2		
	11	296 23.7	317 25.9	27.9	228 03.7	40.9	290 17.6	21.5	327 48.2	03.4					
	12	311 26.2	332 25.4	S10 26.7	243 05.6	N24 41.0	305 19.6	N 1 21.7	342 50.4	S14 03.3	Gacrux	171 53.1	S57 14.3		
	13	326 28.7	347 24.9	25.5	258 07.4	41.0	320 21.6	21.9	357 52.6	03.2	Gienah	175 45.0	S17 40.2		
	14	341 31.1	2 24.5	24.3	273 09.3	41.1	335 23.7	22.1	12 54.7	03.1	Hadar	148 38.2	S60 28.8		
	15	356 33.6	17 24.0	. . 23.1	288 11.2	. . 41.1	350 25.7	. . 22.3	27 56.9	. . 03.0	Hamal	327 53.0	N23 34.3		
	16	11 36.1	32 23.6	21.9	303 13.0	41.2	5 27.7	22.5	42 59.1	02.9	Kaus Aust.	83 35.0	S34 22.4		
	17	26 38.5	47 23.1	20.7	318 14.9	41.2	20 29.8	22.7	58 01.3	02.8					
	18	41 41.0	62 22.7	S10 19.5	333 16.8	N24 41.3	35 31.8	N 1 22.9	73 03.5	S14 02.7	Kochab	137 19.8	N74 03.3		
	19	56 43.5	77 22.2	18.3	348 18.6	41.4	50 33.8	23.1	88 05.6	02.6	Markab	13 31.8	N15 19.7		
	20	71 45.9	92 21.8	17.2	3 20.5	41.4	65 35.9	23.3	103 07.8	02.5	Menkar	314 07.8	N 4 10.7		
	21	86 48.4	107 21.3	. . 16.0	18 22.4	. . 41.5	80 37.9	. . 23.5	118 10.0	. . 02.4	Menkent	147 59.4	S36 28.8		
	22	101 50.9	122 20.9	14.8	33 24.2	41.5	95 39.9	23.7	133 12.2	02.3	Miaplacidus	221 37.7	S69 48.6		
23	116 53.3	137 20.4	13.6	48 26.1	41.6	110 42.0	23.9	148 14.3	02.2						
THURSDAY	2 00	131 55.8	152 20.0	S10 12.4	63 27.9	N24 41.6	125 44.0	N 1 24.1	163 16.5	S14 02.1	Mirfak	308 30.4	N49 56.7		
	01	146 58.2	167 19.5	11.2	78 29.8	41.7	140 46.0	24.2	178 18.7	02.0	Nunki	75 50.1	S26 16.1		
	02	162 00.7	182 19.1	10.0	93 31.6	41.7	155 48.0	24.4	193 20.9	01.9	Peacock	53 08.8	S56 39.7		
	03	177 03.2	197 18.6	. . 08.8	108 33.5	. . 41.8	170 50.1	. . 24.6	208 23.0	. . 01.8	Pollux	243 18.9	N27 58.2		
	04	192 05.6	212 18.2	07.6	123 35.4	41.9	185 52.1	24.8	223 25.2	01.7	Procyon	244 52.2	N 5 09.9		
	05	207 08.1	227 17.8	06.4	138 37.2	41.9	200 54.1	25.0	238 27.4	01.6					
	06	222 10.6	242 17.3	S10 05.2	153 39.1	N24 42.0	215 56.2	N 1 25.2	253 29.6	S14 01.5	Rasalhague	96 00.3	N12 32.4		
	07	237 13.0	257 16.9	04.0	168 40.9	42.0	230 58.2	25.4	268 31.7	01.4	Regulus	207 35.8	N11 51.2		
	08	252 15.5	272 16.4	02.8	183 42.8	42.1	246 00.2	25.6	283 33.9	01.3	Rigel	281 05.2	S 8 10.6		
	09	267 18.0	287 16.0	. . 01.6	198 44.6	. . 42.2	261 02.3	. . 25.8	298 36.1	. . 01.2	Rigel Kent.	139 42.5	S60 55.5		
	10	282 20.4	302 15.5	10 00.4	213 46.5	42.2	276 04.3	26.0	313 38.3	01.1	Sabik	102 04.8	S15 45.2		
	11	297 22.9	317 15.1	9 59.2	228 48.3	42.3	291 06.3	26.2	328 40.4	01.0					
	12	312 25.4	332 14.6	S 9 58.0	243 50.2	N24 42.3	306 08.4	N 1 26.4	343 42.6	S14 00.9	Schedar	349 33.1	N56 40.0		
	13	327 27.8	347 14.2	56.8	258 52.0	42.4	321 10.4	26.6	358 44.8	00.8	Shaula	96 12.8	S37 07.1		
	14	342 30.3	2 13.8	55.6	273 53.8	42.4	336 12.4	26.8	13 47.0	00.7	Sirius	258 27.3	S16 45.0		
	15	357 32.7	17 13.3	. . 54.4	288 55.7	. . 42.5	351 14.4	. . 27.0	28 49.1	. . 00.6	Spica	158 23.9	S11 16.9		
	16	12 35.2	32 12.9	53.2	303 57.5	42.6	6 16.5	27.2	43 51.3	00.5	Suhail	222 47.0	S43 31.5		
	17	27 37.7	47 12.4	52.0	318 59.4	42.6	21 18.5	27.4	58 53.5	00.4					
	18	42 40.1	62 12.0	S 9 50.8	334 01.2	N24 42.7	36 20.5	N 1 27.6	73 55.7	S14 00.3	Vega	80 34.7	N38 48.1		
	19	57 42.6	77 11.6	49.6	349 03.0	42.7	51 22.6	27.8	88 57.8	00.2	Zuben'ubi	136 57.8	S16 08.2		
	20	72 45.1	92 11.1	48.4	4 04.9	42.8	66 24.6	27.9	104 00.0	00.1					
	21	87 47.5	107 10.7	. . 47.2	19 06.7	. . 42.9	81 26.6	. . 28.1	119 02.2	14 00.0					
	22	102 50.0	122 10.2	46.0	34 08.6	42.9	96 28.6	28.3	134 04.4	13 59.9	Venus	21 34.2	h 13 50		
23	117 52.5	137 09.8	44.8	49 10.4	43.0	111 30.7	28.5	149 06.5	S13 59.8	Mars	291 46.4	19 47			
Mer. Pass. 15 13.7		v −0.5 d 1.2		v 1.9 d 0.1		v 2.0 d 0.2		v 2.2 d 0.1		SHA Mer. Pass.					
										Jupiter					
										Saturn					

UT	SUN				MOON							Lat.	Twilight			Sunrise	Moonrise			
	GHA		Dec		GHA		v	Dec	d	HP	Naut.		Civil	h m	31		1	2	3	
	°	'			°	'														°
TUESDAY	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m	
	N 72	07	10	08	40	10	29													
	N 70	07	02	08	21	09	47													
	68	06	56	08	06	09	18													
	66	06	50	07	54	08	57													
	64	06	45	07	44	08	40													
	62	06	40	07	35	08	26													
	60	06	36	07	27	08	14													
	N 58	06	33	07	20	08	04													
	56	06	29	07	14	07	55													
	54	06	26	07	09	07	47													
	52	06	23	07	04	07	40													
	50	06	20	06	59	07	34													
	45	06	14	06	49	07	20													
	N 40	06	08	06	40	07	09													
	35	06	02	06	32	06	59													
	30	05	57	06	25	06	50													
	20	05	46	06	13	06	36													
	N 10	05	35	06	00	06	22													
	0	05	23	05	48	06	10													
	S 10	05	10	05	35	05	57													
	20	04	53	05	21	05	44													
	30	04	32	05	02	05	28													
35	04	18	04	52	05	19														
40	04	02	04	39	05	09														
45	03	41	04	23	04	56														
WEDNESDAY	S 50	03	13	04	03	04	41													
	52	02	59	03	53	04	34													
	54	02	42	03	43	04	26													
	56	02	21	03	30	04	17													
	58	01	53	03	15	04	07													
	S 60	01	08	02	57	03	55													
	Lat.	Sunset		Twilight		Moonset														
				Civil	Naut.	31	1	2	3											
	h m	h m	h m	h m	h m	h m	h m	h m	h m											
	N 72	13	59	15	49	17	18													
	N 70	14	41	16	07	17	26													
	68	15	10	16	22	17	33													
	66	15	31	16	34	17	38													
	64	15	48	16	44	17	43													
	62	16	02	16	53	17	48													
	60	16	13	17	01	17	52													
	N 58	16	23	17	08	17	55													
	56	16	32	17	14	17	59													
	54	16	40	17	19	18	02													
	52	16	47	17	24	18	05													
	50	16	54	17	29	18	07													
	45	17	07	17	39	18	14													
	THURSDAY	N 40	17	19	17	47	18	20												
35		17	28	17	55	18	25													
30		17	37	18	02	18	31													
20		17	52	18	15	18	41													
N 10		18	05	18	27	18	52													
0		18	17	18	39	19	04													
S 10		18	29	18	52	19	17													
20		18	43	19	06	19	34													
30		18	58	19	24	19	55													
35		19	07	19	35	20	08													
40		19	18	19	48	20	24													
45		19	30	20	03	20	45													
S 50		19	45	20	23	21	12													
52		19	52	20	32	21	26													
54		20	00	20	43	21	42													
56		20	08	20	55	22	03													
58		20	18	21	10	22	29													
S 60		20	30	21	27	23	11													
TUESDAY		SUN				MOON														
		Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase											
			00 ^h	12 ^h	Pass.	Upper	Lower													
		d	m s	m s	h m	h m	h m	d %												
		31	13 17	13 22	12 13	20 24	07 59	10 77												
	1	13 26	13 30	12 14	21 15	08 49	11 84													
	2	13 34	13 38	12 14	22 06	09 41	12 91													
	SD 16.3	d 0.7	SD 14.9	14.8	14.7															



UT	ARIES	VENUS	−3.9	MARS	−0.2	JUPITER	−2.2	SATURN	+0.8	STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
d h	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″		° ′ ″	° ′ ″
3 FRI DAY	00 132 54.9	152 09.4 S	9 43.6	64 12.2 N24	43.0	126 32.7 N	1 28.7	164 08.7 S13	59.7	Acamar	315 13.0	S40 13.0
	01 147 57.4	167 08.9	42.4	79 14.1	43.1	141 34.7	28.9	179 10.9	59.6	Achernar	335 21.6	S57 07.5
	02 162 59.9	182 08.5	41.2	94 15.9	43.1	156 36.8	29.1	194 13.1	59.5	Acrux	173 01.4	S63 13.4
	03 178 02.3	197 08.0	40.0	109 17.7	43.2	171 38.8	29.3	209 15.2	59.4	Adhara	255 06.8	S29 00.3
	04 193 04.8	212 07.6	38.8	124 19.6	43.3	186 40.8	29.5	224 17.4	59.3	Aldebaran	290 41.3	N16 33.3
	05 208 07.2	227 07.2	37.6	139 21.4	43.3	201 42.8	29.7	239 19.6	59.2			
	06 223 09.7	242 06.7 S	9 36.4	154 23.2 N24	43.4	216 44.9 N	1 29.9	254 21.8 S13	59.1	Alioth	166 14.1	N55 49.8
	07 238 12.2	257 06.3	35.2	169 25.0	43.4	231 46.9	30.1	269 23.9	59.0	Alkaid	152 53.1	N49 11.6
	08 253 14.6	272 05.9	34.0	184 26.9	43.5	246 48.9	30.3	284 26.1	58.9	Alnair	27 35.3	S46 51.1
	09 268 17.1	287 05.4	32.8	199 28.7	43.6	261 50.9	30.5	299 28.3	58.8	Anilam	275 39.1	S 1 11.1
	10 283 19.6	302 05.0	31.6	214 30.5	43.6	276 53.0	30.7	314 30.5	58.7	Alphard	217 49.0	S 8 45.6
	11 298 22.0	317 04.6	30.3	229 32.3	43.7	291 55.0	30.9	329 32.6	58.6			
	12 313 24.5	332 04.1 S	9 29.1	244 34.2 N24	43.7	306 57.0 N	1 31.1	344 34.8 S13	58.5	Alphecca	126 05.2	N46 38.0
	13 328 27.0	347 03.7	27.9	259 36.0	43.8	321 59.0	31.3	359 37.0	58.4	Alpheratz	357 36.7	N29 13.1
	14 343 29.4	2 03.3	26.7	274 37.8	43.9	337 01.1	31.5	14 39.2	58.3	Altair	62 01.8	N 8 55.6
	15 358 31.9	17 02.8	25.5	289 39.6	43.9	352 03.1	31.7	29 41.3	58.2	Ankaa	353 09.0	S42 11.1
	16 13 34.4	32 02.4	24.3	304 41.4	44.0	7 05.1	31.9	44 43.5	58.1	Antares	112 17.9	S26 28.9
	17 28 36.8	47 02.0	23.1	319 43.3	44.0	22 07.1	32.1	59 45.7	58.0			
	18 43 39.3	62 01.5 S	9 21.9	334 45.1 N24	44.1	37 09.2 N	1 32.3	74 47.9 S13	57.9	Arcturus	145 49.3	N19 03.6
	19 58 41.7	77 01.1	20.7	349 46.9	44.2	52 11.2	32.5	89 50.0	57.8	Atria	107 13.9	S69 03.9
	20 73 44.2	92 00.7	19.5	4 48.7	44.2	67 13.2	32.7	104 52.2	57.7	Avior	234 14.7	S59 35.0
	21 88 46.7	107 00.3	18.2	19 50.5	44.3	82 15.2	32.9	119 54.4	57.6	Bellatrix	278 24.4	N 6 22.2
	22 103 49.1	121 59.8	17.0	34 52.3	44.3	97 17.3	33.0	134 56.6	57.5	Betelgeuse	270 53.6	N 7 24.6
23 118 51.6	136 59.4	15.8	49 54.1	44.4	112 19.3	33.2	149 58.7	57.4				
4 SAT URDAY	00 133 54.1	151 59.0 S	9 14.6	64 56.0 N24	44.5	127 21.3 N	1 33.4	165 00.9 S13	57.3	Canopus	263 52.7	S52 42.6
	01 148 56.5	166 58.5	13.4	79 57.8	44.5	142 23.3	33.6	180 03.1	57.2	Atria	280 23.9	N46 01.4
	02 163 59.0	181 58.1	12.2	94 59.6	44.6	157 25.4	33.8	195 05.3	57.1	Deneb	49 27.3	N45 21.6
	03 179 01.5	196 57.7	11.0	110 01.4	44.6	172 27.4	34.0	210 07.4	57.0	Denebola	182 26.3	N14 26.5
	04 194 03.9	211 57.3	09.7	125 03.2	44.7	187 29.4	34.2	225 09.6	56.9	Diphda	348 49.1	S17 51.8
	05 209 06.4	226 56.8	08.5	140 05.0	44.8	202 31.4	34.4	240 11.8	56.8			
	06 224 08.8	241 56.4 S	9 07.3	155 06.8 N24	44.8	217 33.5 N	1 34.6	255 14.0 S13	56.7	Dubhe	193 42.4	N61 37.4
	07 239 11.3	256 56.0	06.1	170 08.6	44.9	232 35.5	34.8	270 16.1	56.6	Elath	278 03.6	N28 37.6
	08 254 13.8	271 55.6	04.9	185 10.4	45.0	247 37.5	35.0	285 18.3	56.5	Eltanin	90 43.3	N51 28.9
	09 269 16.2	286 55.1	03.7	200 12.2	45.0	262 39.5	35.2	300 20.5	56.4	Enif	33 40.7	N 9 58.7
	10 284 18.7	301 54.7	02.4	215 14.0	45.1	277 41.6	35.4	315 22.7	56.3	Fomalhaut	15 16.6	S29 30.2
	11 299 21.2	316 54.3	01.2	230 15.8	45.1	292 43.6	35.6	330 24.8	56.2			
	12 314 23.6	331 53.9 S	9 00.0	245 17.6 N24	45.2	307 45.6 N	1 35.8	345 27.0 S13	56.1	Gacrux	171 53.1	S57 14.3
	13 329 26.1	346 53.4	8 58.8	260 19.4	45.3	322 47.6	36.0	0 29.2	56.0	Gienah	175 45.0	S17 40.2
	14 344 28.6	1 53.0	57.6	275 21.2	45.3	337 49.6	36.2	15 31.3	55.9	Hadar	148 38.1	S60 28.8
	15 359 31.0	16 52.6	56.3	290 23.0	45.4	352 51.7	36.4	30 33.5	55.8	Hamal	327 53.0	N23 34.3
	16 14 33.5	31 52.2	55.1	305 24.8	45.4	7 53.7	36.6	45 35.7	55.7	Kaus Aust.	83 34.9	S34 22.4
	17 29 36.0	46 51.7	53.9	320 26.6	45.5	22 55.7	36.8	60 37.9	55.6			
	18 44 38.4	61 51.3 S	8 52.7	335 28.4 N24	45.6	37 57.7 N	1 37.0	75 40.0 S13	55.5	Kochab	137 19.8	N74 03.3
	19 59 40.9	76 50.9	51.5	350 30.2	45.6	52 59.8	37.2	90 42.2	55.4	Markab	13 31.8	N15 19.7
	20 74 43.3	91 50.5	50.2	5 32.0	45.7	68 01.8	37.4	105 44.4	55.3	Menkar	314 07.8	N 4 10.7
	21 89 45.8	106 50.1	49.0	20 33.8	45.8	83 03.8	37.6	120 46.6	55.2	Menkent	147 59.4	S36 28.8
	22 104 48.3	121 49.6	47.8	35 35.6	45.8	98 05.8	37.8	135 48.7	55.1	Miaplacidus	221 37.7	S69 48.6
23 119 50.7	136 49.2	46.6	50 37.3	45.9	113 07.8	38.0	150 50.9	55.0				
5 SUN DAY	00 134 53.2	151 48.8 S	8 45.3	65 39.1 N24	45.9	128 09.9 N	1 38.2	165 53.1 S13	54.9	Mirfak	308 30.4	N49 56.1
	01 149 55.7	166 48.4	44.1	80 40.9	46.0	143 11.9	38.4	180 55.3	54.8	Nunki	75 50.0	S26 16.1
	02 164 58.1	181 48.0	42.9	95 42.7	46.1	158 13.9	38.6	195 57.4	54.7	Peacock	53 08.8	S56 39.7
	03 180 00.6	196 47.6	41.7	110 44.5	46.1	173 15.9	38.8	210 59.6	54.6	Pollux	243 18.9	N27 58.2
	04 195 03.1	211 47.1	40.4	125 46.3	46.2	188 17.9	39.0	226 01.8	54.5	Procyon	244 52.2	N 5 09.9
	05 210 05.5	226 46.7	39.2	140 48.1	46.3	203 20.0	39.2	241 04.0	54.4			
	06 225 08.0	241 46.3 S	8 38.0	155 49.8 N24	46.3	218 22.0 N	1 39.4	256 06.1 S13	54.3	Rasalhague	96 00.2	N12 32.4
	07 240 10.5	256 45.9	36.8	170 51.6	46.4	233 24.0	39.6	271 08.3	54.2	Regulus	207 35.8	N11 51.2
	08 255 12.9	271 45.5	35.5	185 53.4	46.4	248 26.0	39.8	286 10.5	54.1	Rigel	281 05.2	S 8 10.6
	09 270 15.4	286 45.1	34.3	200 55.2	46.5	263 28.0	40.0	301 12.7	54.0	Rigel Kent.	139 42.4	S60 55.5
	10 285 17.8	301 44.6	33.1	215 57.0	46.6	278 30.1	40.2	316 14.8	53.9	Sabik	102 04.8	S15 45.2
	11 300 20.3	316 44.2	31.9	230 58.7	46.6	293 32.1	40.4	331 17.0	53.8			
	12 315 22.8	331 43.8 S	8 30.6	246 00.5 N24	46.7	308 34.1 N	1 40.6	346 19.2 S13	53.7	Schedar	349 33.2	N56 40.0
	13 330 25.2	346 43.4	29.4	261 02.3	46.8	323 36.1	40.8	1 21.3	53.6	Shaula	96 12.8	S37 07.1
	14 345 27.7	1 43.0	28.2	276 04.1	46.8	338 38.1	41.0	16 23.5	53.5	Sirius	258 27.3	S16 45.0
	15 0 30.2	16 42.6	26.9	291 05.8	46.9	353 40.1	41.2	31 25.7	53.4	Spica	158 23.8	S11 16.9
	16 15 32.6	31 42.2	25.7	306 07.6	46.9	8 42.2	41.4	46 27.9	53.3	Suhail	222 47.0	S43 31.5
	17 30 35.1	46 41.8	24.5	321 09.4	47.0	23 44.2	41.6	61 30.0	53.2			
	18 45 37.6	61 41.3 S	8 23.3	336 11.2 N24	47.1	38 46.2 N	1 41.8	76 32.2 S13	53.1	Vega	80 34.6	N38 48.1
	19 60 40.0	76 40.9	22.0	351 12.9	47.1	53 48.2	42.0	91 34.4	53.0	Zuben'ubi	136 57.8	S16 08.2
	20 75 42.5	91 40.5	20.8	6 14.7	47.2	68 50.2	42.2	106 36.6	52.9		SHA	Mer.Pass
	21 90 45.0	106 40.1	19.6	21 16.5	47.3	83 52.2	42.4	121 38.7	52.8		° ′ ″	h m
	22 105 47.4	121 39.7	18.3	36 18.2	47.3	98 54.3	42.6	136 40.9	52.7	Venus	18 04.9	13 52
23 120 49.9	136 39.3	17.1	51 20.0	47.4	113 56.3	42.8	151 43.1	52.6	Mars	291 01.9	19 38	
	h m									Jupiter	353 27.3	15 28
Mer.Pass. 15 01.9		v −0.4 d 1.2		v 1.8 d 0.1		v 2.0 d 0.2		v 2.2 d 0.1		Saturn	31 06.8	12 58

INDEX TO SELECTED STARS, 2022

Name	No	Mag	SHA	Dec
<i>Acamar</i>	7	3.2	315	S 40
<i>Achernar</i>	5	0.5	335	S 57
<i>Acrux</i>	30	1.3	173	S 63
<i>Adhara</i>	19	1.5	255	S 29
<i>Aldebaran</i>	10	0.9	291	N 17
<i>Alioth</i>	32	1.8	166	N 56
<i>Alkaid</i>	34	1.9	153	N 49
<i>Alnair</i>	55	1.7	28	S 47
<i>Alnilam</i>	15	1.7	276	S 1
<i>Alphard</i>	25	2.0	218	S 9
<i>Alphecca</i>	41	2.2	126	N 27
<i>Alpheratz</i>	1	2.1	358	N 29
<i>Altair</i>	51	0.8	62	N 9
<i>Ankaa</i>	2	2.4	353	S 42
<i>Antares</i>	42	1.0	112	S 26
<i>Arcturus</i>	37	0.0	146	N 19
<i>Atria</i>	43	1.9	107	S 69
<i>Avior</i>	22	1.9	234	S 60
<i>Bellatrix</i>	13	1.6	278	N 6
<i>Betelgeuse</i>	16	Var.*	271	N 7
<i>Canopus</i>	17	-0.7	264	S 53
<i>Capella</i>	12	0.1	280	N 46
<i>Deneb</i>	53	1.3	49	N 45
<i>Denebola</i>	28	2.1	182	N 14
<i>Diphda</i>	4	2.0	349	S 18
<i>Dubhe</i>	27	1.8	194	N 62
<i>Elnath</i>	14	1.7	278	N 29
<i>Eltanin</i>	47	2.2	91	N 51
<i>Enif</i>	54	2.4	34	N 10
<i>Fomalhaut</i>	56	1.2	15	S 30
<i>Gacrux</i>	31	1.6	172	S 57
<i>Gienah</i>	29	2.6	176	S 18
<i>Hadar</i>	35	0.6	149	S 60
<i>Hamal</i>	6	2.0	328	N 24
<i>Kaus Australis</i>	48	1.9	84	S 34
<i>Kochab</i>	40	2.1	137	N 74
<i>Markab</i>	57	2.5	14	N 15
<i>Menkar</i>	8	2.5	314	N 4
<i>Menkent</i>	36	2.1	148	S 36
<i>Miaplacidus</i>	24	1.7	222	S 70
<i>Mirfak</i>	9	1.8	309	N 50
<i>Nunki</i>	50	2.0	76	S 26
<i>Peacock</i>	52	1.9	53	S 57
<i>Pollux</i>	21	1.1	243	N 28
<i>Procyon</i>	20	0.4	245	N 5
<i>Rasalhague</i>	46	2.1	96	N 13
<i>Regulus</i>	26	1.4	208	N 12
<i>Rigel</i>	11	0.1	281	S 8
<i>Rigil Kentaurus</i>	38	-0.3	140	S 61
<i>Sabik</i>	44	2.4	102	S 16
<i>Schedar</i>	3	2.2	350	N 57
<i>Shaula</i>	45	1.6	96	S 37
<i>Sirius</i>	18	-1.5	258	S 17
<i>Spica</i>	33	1.0	158	S 11
<i>Suhail</i>	23	2.2	223	S 44
<i>Vega</i>	49	0.0	81	N 39
<i>Zubenelgenubi</i>	39	2.8	137	S 16

No	Name	Mag	SHA	Dec
1	<i>Alpheratz</i>	2.1	358	N 29
2	<i>Ankaa</i>	2.4	353	S 42
3	<i>Schedar</i>	2.2	350	N 57
4	<i>Diphda</i>	2.0	349	S 18
5	<i>Achernar</i>	0.5	335	S 57
6	<i>Hamal</i>	2.0	328	N 24
7	<i>Acamar</i>	3.2	315	S 40
8	<i>Menkar</i>	2.5	314	N 4
9	<i>Mirfak</i>	1.8	309	N 50
10	<i>Aldebaran</i>	0.9	291	N 17
11	<i>Rigel</i>	0.1	281	S 8
12	<i>Capella</i>	0.1	280	N 46
13	<i>Bellatrix</i>	1.6	278	N 6
14	<i>Elnath</i>	1.7	278	N 29
15	<i>Alnilam</i>	1.7	276	S 1
16	<i>Betelgeuse</i>	Var.*	271	N 7
17	<i>Canopus</i>	-0.7	264	S 53
18	<i>Sirius</i>	-1.5	258	S 17
19	<i>Adhara</i>	1.5	255	S 29
20	<i>Procyon</i>	0.4	245	N 5
21	<i>Pollux</i>	1.1	243	N 28
22	<i>Avior</i>	1.9	234	S 60
23	<i>Suhail</i>	2.2	223	S 44
24	<i>Miaplacidus</i>	1.7	222	S 70
25	<i>Alphard</i>	2.0	218	S 9
26	<i>Regulus</i>	1.4	208	N 12
27	<i>Dubhe</i>	1.8	194	N 62
28	<i>Denebola</i>	2.1	182	N 14
29	<i>Gienah</i>	2.6	176	S 18
30	<i>Acrux</i>	1.3	173	S 63
31	<i>Gacrux</i>	1.6	172	S 57
32	<i>Alioth</i>	1.8	166	N 56
33	<i>Spica</i>	1.0	158	S 11
34	<i>Alkaid</i>	1.9	153	N 49
35	<i>Hadar</i>	0.6	149	S 60
36	<i>Menkent</i>	2.1	148	S 36
37	<i>Arcturus</i>	0.0	146	N 19
38	<i>Rigil Kentaurus</i>	-0.3	140	S 61
39	<i>Zubenelgenubi</i>	2.8	137	S 16
40	<i>Kochab</i>	2.1	137	N 74
41	<i>Alphecca</i>	2.2	126	N 27
42	<i>Antares</i>	1.0	112	S 26
43	<i>Atria</i>	1.9	107	S 69
44	<i>Sabik</i>	2.4	102	S 16
45	<i>Shaula</i>	1.6	96	S 37
46	<i>Rasalhague</i>	2.1	96	N 13
47	<i>Eltanin</i>	2.2	91	N 51
48	<i>Kaus Australis</i>	1.9	84	S 34
49	<i>Vega</i>	0.0	81	N 39
50	<i>Nunki</i>	2.0	76	S 26
51	<i>Altair</i>	0.8	62	N 9
52	<i>Peacock</i>	1.9	53	S 57
53	<i>Deneb</i>	1.3	49	N 45
54	<i>Enif</i>	2.4	34	N 10
55	<i>Alnair</i>	1.7	28	S 47
56	<i>Fomalhaut</i>	1.2	15	S 30
57	<i>Markab</i>	2.5	14	N 15

ALTITUDE CORRECTION TABLES 10°-90°—SUN, STARS, PLANETS

OCT.—MAR. SUN			APR.—SEPT.			STARS AND PLANETS				DIP				
App. Alt.	Lower Limb	Upper Limb	App. Alt.	Lower Limb	Upper Limb	App. Alt.	Corr ⁿ	App. Alt.	Additional Corr ⁿ	Ht. of Eye	Corr ⁿ	Ht. of Eye	Ht. of Eye	Corr ⁿ
9 33	+10.8	-21.5	9 39	+10.6	-21.2	9 55	-5.3	2022		m		ft.	m	
9 45	+10.9	-21.4	9 50	+10.7	-21.1	10 07	-5.2	VENUS		2.4	-2.8	8.0	1.0	-1.8
9 56	+11.0	-21.3	10 02	+10.8	-21.0	10 20	-5.1	Jan. 1—Jan. 6		2.6	-2.9	8.6	1.5	-2.2
10 08	+11.1	-21.2	10 14	+10.9	-20.9	10 32	-5.0	Jan. 11—Jan. 29		2.8	-3.0	9.2	2.0	-2.5
10 20	+11.2	-21.1	10 27	+11.0	-20.8	10 46	-4.9	°		3.0	-3.1	9.8	2.5	-2.8
10 33	+11.3	-21.0	10 40	+11.1	-20.7	10 59	-4.8	0 +0.5		3.2	-3.2	10.5	3.0	-3.3
10 46	+11.4	-20.9	10 53	+11.2	-20.6	11 14	-4.7	26 +0.4		3.4	-3.3	11.2	See table	
11 00	+11.5	-20.8	11 07	+11.3	-20.5	11 29	-4.6	46 +0.3		3.6	-3.4	11.9	←	
11 15	+11.6	-20.7	11 22	+11.4	-20.4	11 44	-4.5	60 +0.2		3.8	-3.5	12.6	m	
11 30	+11.7	-20.6	11 37	+11.5	-20.3	12 00	-4.4	73 +0.1		4.0	-3.6	13.3	20	-7.9
11 45	+11.8	-20.5	11 53	+11.6	-20.2	12 17	-4.3	84		4.3	-3.7	14.1	22	-8.3
12 01	+11.9	-20.4	12 10	+11.7	-20.1	12 35	-4.2	Jan. 7—Jan. 10		4.5	-3.8	14.9	24	-8.6
12 18	+12.0	-20.3	12 27	+11.8	-20.0	12 53	-4.1	°		4.7	-3.9	15.7	26	-9.0
12 36	+12.1	-20.2	12 45	+11.9	-19.9	13 12	-4.0	0 +0.6		5.0	-4.0	16.5	28	-9.3
12 54	+12.2	-20.1	13 04	+12.0	-19.8	13 32	-3.9	24 +0.5		5.2	-4.1	17.4		
13 14	+12.3	-20.0	13 24	+12.1	-19.7	13 53	-3.8	41 +0.4		5.5	-4.2	18.3	30	-9.6
13 34	+12.4	-19.9	13 44	+12.2	-19.6	14 16	-3.7	65 +0.3		5.8	-4.3	19.1	32	-10.0
13 55	+12.5	-19.8	14 06	+12.3	-19.5	14 39	-3.6	76 +0.2		6.1	-4.4	20.1	34	-10.3
14 17	+12.6	-19.7	14 29	+12.4	-19.4	15 03	-3.5	85 +0.1		6.3	-4.5	21.0	36	-10.6
14 41	+12.7	-19.6	14 53	+12.5	-19.3	15 29	-3.4	Jan. 30—Feb. 13		6.6	-4.6	22.0	38	-10.8
15 05	+12.8	-19.5	15 18	+12.6	-19.2	15 56	-3.3	°		6.9	-4.7	22.9		
15 31	+12.9	-19.4	15 45	+12.7	-19.1	16 25	-3.2	0 +0.4		7.2	-4.8	23.9	40	-11.1
15 59	+13.0	-19.3	16 13	+12.8	-19.0	16 55	-3.1	29 +0.3		7.5	-4.9	24.9	42	-11.4
16 27	+13.1	-19.2	16 43	+12.9	-18.9	17 27	-3.0	51 +0.2		7.9	-5.0	26.0	44	-11.7
16 58	+13.2	-19.1	17 14	+13.0	-18.8	18 01	-2.9	83 +0.1		8.2	-5.1	27.1	46	-11.9
17 30	+13.3	-19.0	17 47	+13.1	-18.7	18 37	-2.8	Feb. 14—Mar. 8		8.5	-5.2	28.1	48	-12.2
18 05	+13.4	-18.9	18 23	+13.2	-18.6	19 16	-2.7	°		8.8	-5.3	29.2		
18 41	+13.5	-18.8	19 00	+13.3	-18.5	19 56	-2.6	0 +0.3		9.2	-5.4	30.4	ft.	
19 20	+13.6	-18.7	19 41	+13.4	-18.4	20 40	-2.5	34 +0.2		9.5	-5.5	31.5	2	-1.4
20 02	+13.7	-18.6	20 24	+13.5	-18.3	21 27	-2.4	60 +0.1		9.9	-5.6	32.7	4	-1.9
20 46	+13.8	-18.5	21 10	+13.6	-18.2	22 17	-2.3	80		10.3	-5.7	33.9	6	-2.4
21 34	+13.9	-18.4	21 59	+13.7	-18.1	23 11	-2.2	Mar. 9—Apr. 28		10.6	-5.8	35.1	8	-2.7
22 25	+14.0	-18.3	22 52	+13.8	-18.0	24 09	-2.1	°		11.0	-5.9	36.3	10	-3.1
23 20	+14.1	-18.2	23 49	+13.9	-17.9	25 12	-2.0	41 +0.2		11.4	-6.0	37.6	See table	
24 20	+14.2	-18.1	24 51	+14.0	-17.8	26 20	-1.9	76 +0.1		11.8	-6.1	38.9	←	
25 24	+14.3	-18.0	25 58	+14.1	-17.7	27 34	-1.8	Apr. 29—Dec. 31		12.2	-6.2	40.1	ft.	
26 34	+14.4	-17.9	27 11	+14.2	-17.6	28 54	-1.7	°		12.6	-6.3	41.5	70	-8.1
27 50	+14.5	-17.8	28 31	+14.3	-17.5	30 22	-1.6	0 +0.1		13.0	-6.4	42.8	75	-8.4
29 13	+14.6	-17.7	29 58	+14.4	-17.4	31 58	-1.5	60		13.4	-6.5	44.2	80	-8.7
30 44	+14.7	-17.6	31 33	+14.5	-17.3	33 43	-1.4	MARS		13.8	-6.6	45.5	85	-8.9
32 24	+14.8	-17.5	33 18	+14.6	-17.2	35 38	-1.3	Jan. 1—Aug. 28		14.2	-6.7	46.9	90	-9.2
34 15	+14.9	-17.4	35 15	+14.7	-17.1	37 45	-1.2	°		14.7	-6.8	48.4	95	-9.5
36 17	+15.0	-17.3	37 24	+14.8	-17.0	40 06	-1.1	60 +0.1		15.1	-6.9	49.8		
38 34	+15.1	-17.2	39 48	+14.9	-16.9	42 42	-1.0	Aug. 29—Nov. 9		15.5	-7.0	51.3	100	-9.7
41 06	+15.2	-17.1	42 28	+15.0	-16.8	45 34	-0.9	Dec. 22—Dec. 31		16.0	-7.1	52.8	105	-9.9
43 56	+15.3	-17.0	45 29	+15.1	-16.7	48 45	-0.8	°		16.5	-7.2	54.3	110	-10.2
47 07	+15.4	-16.9	48 52	+15.2	-16.6	52 16	-0.7	0 +0.2		16.9	-7.3	55.8	115	-10.4
50 43	+15.5	-16.8	52 41	+15.3	-16.5	56 09	-0.6	41 +0.1		17.4	-7.4	57.4	120	-10.6
54 46	+15.6	-16.7	56 59	+15.4	-16.4	60 26	-0.5	76		17.9	-7.5	58.9	125	-10.8
59 21	+15.7	-16.6	61 50	+15.5	-16.3	65 06	-0.4	Nov. 10—Dec. 21		18.4	-7.6	60.5		
64 28	+15.8	-16.5	67 15	+15.6	-16.2	70 09	-0.3	°		18.8	-7.7	62.1	130	-11.1
70 10	+15.9	-16.4	73 14	+15.7	-16.1	75 32	-0.2	0 +0.3		19.3	-7.8	63.8	135	-11.3
76 24	+16.0	-16.3	79 42	+15.8	-16.0	81 12	-0.1	34 +0.2		19.8	-7.9	65.4	140	-11.5
83 05	+16.1	-16.2	86 31	+15.9	-15.9	87 03	0.0	60 +0.1		20.4	-8.0	67.1	145	-11.7
90 00			90 00			90 00		80		20.9	-8.1	68.8	150	-11.9
										21.4		70.5	155	-12.1

App. Alt. = Apparent altitude = Sextant altitude corrected for index error and dip.

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	3	4	5	6		
d h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m
3 00	176	34.6	S16	39.8	27	25.4	10.3	N27	14.6	2.2	54.0	N 72	07 00	08 26	10 06				14 14	
01	191	34.6		39.1	41	54.7	10.3	N27	12.4	2.3	54.0	N 70	06 53	08 09	09 30				15 12	
02	206	34.5		38.3	56	24.0	10.3	27	10.1	2.4	54.0	68	06 47	07 56	09 06				15 46	
03	221	34.4		37.6	70	53.3	10.4	27	07.7	2.5	54.0	66	06 42	07 45	08 46				16 10	
04	236	34.4		36.9	85	22.7	10.3	27	05.2	2.7	54.0	64	06 38	07 36	08 31		12 49	14 45	16 29	
05	251	34.3		36.1	99	52.0	10.4	27	02.5	2.8	54.0	62	06 34	07 28	08 18	11 53	13 32	15 10	16 44	
06	266	34.2	S16	35.4	114	21.4	10.5	N26	59.7	2.9	54.0	60	06 31	07 21	08 07	12 36	14 00	15 29	16 57	
07	281	34.1		34.7	128	50.9	10.4	26	56.8	3.1	54.0	N 58	06 27	07 15	07 58	13 05	14 22	15 45	17 08	
08	296	34.1		33.9	143	20.3	10.6	26	53.7	3.2	54.0	56	06 24	07 09	07 50	13 27	14 40	15 58	17 17	
09	311	34.0		33.2	157	49.9	10.5	26	50.5	3.3	54.0	54	06 22	07 04	07 42	13 45	14 55	16 10	17 26	
10	326	33.9		32.5	172	19.4	10.6	26	47.2	3.4	54.0	52	06 19	06 59	07 36	14 01	15 08	16 20	17 33	
11	341	33.9		31.7	186	49.0	10.6	26	43.8	3.6	54.0	50	06 16	06 55	07 30	14 14	15 20	16 29	17 40	
12	356	33.8	S16	31.0	201	18.6	10.6	N26	40.2	3.7	54.0	45	06 11	06 46	07 17	14 41	15 43	16 49	17 54	
13	11	33.7		30.3	215	48.2	10.7	26	36.5	3.8	54.0	N 40	06 05	06 37	07 06	15 03	16 02	17 04	18 06	
14	26	33.7		29.5	230	17.9	10.7	26	32.7	3.9	54.0	35	06 00	06 30	06 57	15 20	16 18	17 17	18 16	
15	41	33.6		28.8	244	47.6	10.8	26	28.8	4.1	54.0	30	05 55	06 24	06 49	15 36	16 32	17 29	18 25	
16	56	33.5		28.0	259	17.4	10.8	26	24.7	4.2	54.0	N 10	05 45	06 12	06 35	16 02	16 55	17 48	18 40	
17	71	33.5		27.3	273	47.2	10.8	26	20.5	4.3	54.0	0	05 35	06 00	06 22	16 24	17 15	18 05	18 53	
18	86	33.4	S16	26.6	288	17.0	10.9	N26	16.2	4.4	54.0	S 10	05 11	05 36	05 58	17 05	17 52	18 36	19 17	
19	101	33.4		25.8	302	46.9	10.9	26	11.8	4.6	54.0	20	04 55	05 22	05 46	17 28	18 12	18 53	19 30	
20	116	33.3		25.1	317	16.8	11.0	26	07.2	4.7	54.0	30	04 35	05 05	05 31	17 53	18 35	19 12	19 44	
21	131	33.2		24.3	331	46.8	11.0	26	02.5	4.8	54.0	35	04 22	04 55	05 22	18 08	18 48	19 23	19 53	
22	146	33.2		23.6	346	16.8	11.1	25	57.7	4.9	54.0	40	04 06	04 43	05 12	18 26	19 04	19 35	20 02	
23	161	33.1		22.9	0	46.9	11.1	25	52.8	5.0	54.0	45	03 47	04 28	05 01	18 47	19 22	19 50	20 13	
4 00	176	33.0	S16	22.1	15	17.0	11.1	N25	47.8	5.2	54.0	S 50	03 21	04 09	04 46	19 14	19 45	20 08	20 27	
01	191	33.0		21.4	29	47.1	11.2	25	42.6	5.3	53.9	52	03 07	04 00	04 40	19 26	19 56	20 17	20 33	
02	206	32.9		20.6	44	17.3	11.3	25	37.3	5.4	53.9	54	02 52	03 50	04 32	19 41	20 08	20 26	20 40	
03	221	32.9		19.9	58	47.6	11.2	25	31.9	5.5	53.9	56	02 33	03 38	04 24	19 58	20 22	20 37	20 48	
04	236	32.8		19.2	73	17.8	11.4	25	26.4	5.6	53.9	58	02 08	03 24	04 15	20 19	20 38	20 49	20 56	
05	251	32.7		18.4	87	48.2	11.4	25	20.8	5.8	53.9	S 60	01 33	03 08	04 04	20 45	20 58	21 03	21 06	
06	266	32.7	S16	17.7	102	18.6	11.4	N25	15.0	5.8	53.9	Lat.	Sunset	Twilight		Moonset				
07	281	32.6		16.9	116	49.0	11.5	25	09.2	6.0	53.9			Civil	Naut.	3	4	5	6	
08	296	32.6		16.2	131	19.5	11.6	25	03.2	6.1	53.9	°	h m	h m	h m	h m	h m	h m	h m	h m
09	311	32.5		15.4	145	50.1	11.6	24	57.1	6.2	53.9									
10	326	32.4		14.7	160	20.7	11.6	24	50.9	6.4	53.9	N 70	14 58	16 20	17 36				10 53	
11	341	32.4		13.9	174	51.3	11.7	24	44.5	6.4	53.9	68	15 23	16 33	17 42				11 18	
12	356	32.3	S16	13.2	189	22.0	11.8	N24	38.1	6.6	53.9	66	15 42	16 44	17 47				10 18	
13	11	32.3		12.4	203	52.8	11.8	24	31.5	6.6	53.9	64	15 58	16 53	17 51		10 03	09 44	09 33	
14	26	32.2		11.7	218	23.6	11.8	24	24.9	6.8	53.9	62	16 10	17 01	17 55	09 15	09 19	09 19	09 17	
15	41	32.1		10.9	232	54.4	11.9	24	18.1	6.9	53.9	60	16 21	17 08	17 58	08 31	08 50	08 59	09 03	
16	56	32.1		10.2	247	25.3	12.0	24	11.2	7.0	53.9	N 58	16 31	17 14	18 01	08 02	08 28	08 42	08 52	
17	71	32.0		09.4	261	56.3	12.0	24	04.2	7.1	54.0	56	16 39	17 20	18 04	07 40	08 09	08 28	08 41	
18	86	32.0	S16	08.7	276	27.3	12.1	N23	57.1	7.2	54.0	54	16 46	17 25	18 07	07 22	07 54	08 16	08 32	
19	101	31.9		07.9	290	58.4	12.2	23	49.9	7.3	54.0	52	16 53	17 29	18 10	07 06	07 41	08 06	08 24	
20	116	31.9		07.2	305	29.6	12.1	23	42.6	7.4	54.0	50	16 59	17 33	18 12	06 53	07 29	07 56	08 17	
21	131	31.8		06.4	320	00.7	12.3	23	35.2	7.5	54.0	45	17 12	17 43	18 18	06 25	07 04	07 36	08 01	
22	146	31.8		05.7	334	32.0	12.3	23	27.7	7.6	54.0	N 40	17 22	17 51	18 23	06 03	06 45	07 19	07 48	
23	161	31.7		04.9	349	03.3	12.4	23	20.1	7.8	54.0	35	17 31	17 58	18 28	05 45	06 28	07 05	07 37	
5 00	176	31.7	S16	04.2	3	34.7	12.4	N23	12.3	7.8	54.0	30	17 39	18 04	18 33	05 30	06 14	06 53	07 27	
01	191	31.6		03.4	18	06.1	12.5	23	04.5	7.9	54.0	20	17 53	18 16	18 43	05 03	05 50	06 32	07 11	
02	206	31.5		02.7	32	37.6	12.5	22	56.6	8.1	54.0	N 10	18 06	18 28	18 53	04 40	05 28	06 14	06 56	
03	221	31.5		01.9	47	09.1	12.6	22	48.5	8.1	54.0	0	18 17	18 39	19 04	04 19	05 09	05 57	06 42	
04	236	31.4		01.2	61	40.7	12.6	22	40.4	8.3	54.0	S 10	18 29	18 51	19 17	03 57	04 49	05 39	06 28	
05	251	31.4		00.4	76	12.3	12.7	22	32.1	8.3	54.0	20	18 42	19 05	19 32	03 34	04 28	05 21	06 13	
06	266	31.3	S15	59.7	90	44.0	12.8	N22	23.8	8.4	54.0	30	18 56	19 22	19 52	03 07	04 03	04 59	05 56	
07	281	31.3		58.9	105	15.8	12.8	22	15.4	8.6	54.0	35	19 05	19 32	20 05	02 52	03 48	04 47	05 46	
08	296	31.2		58.1	119	47.6	12.9	22	06.8	8.6	54.0	40	19 15	19 44	20 21	02 33	03 31	04 32	05 34	
09	311	31.2		57.4	134	19.5	12.9	21	58.2	8.7	54.0	45	19 26	19 59	20 40	02 11	03 11	04 15	05 20	
10	326	31.1		56.6	148	51.4	13.0	21	49.5	8.9	54.0	S 50	19 40	20 17	21 06	01 42	02 45	03 53	05 03	
11	341	31.1		55.9	163	23.4	13.1	21	40.6	8.9	54.0	52	19 47	20 26	21 18	01 28	02 32	03 42	04 55	
12	356	31.0	S15	55.1	177	55.5	13.1	N21	31.7	9.0	54.0	54	19 54	20 36	21 34	01 12	02 18	03 31	04 46	
13	11	31.0		54.4	192	27.6	13.2	21	22.7	9.1	54.0	56	20 02	20 48	21 52	00 52	02 01	03 17	04 36	
14	26	30.9		53.6	206	59.8	13.2	21	13.6	9.2	54.0	58	20 12	21 01	22 16	00 28	01 40	03 01	04 25	
15	41	30.9		52.8	221	32.0	13.3	21	04.4	9.3	54.0	S 60	20 22	21 17	22 49	25 14	01 14	02 42	04 11	
16	56	30.8		52.1	236	04.3	13.3	20	55.1	9.3	54.0	Day	SUN		MOON					
17	71	30.8		51.3	250	36.6	13.4	20	45.8	9.5	54.0		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
18	86	30.7	S15	50.6	265	09.0	13.5	N20	36.3	9.6	54.0	00 ^h	12 ^h	Pass.	Upper	Lower	d	%		
19	101	30.7		49.8	279	41.5	13.5	20	26.7	9.6	54.0	3	13 41	13 45	12 14	22 57	10 32	13 95		
20	116	30.6		49.0	294	14.0	13.5	20	17.1	9.7	54.0	4	13 48	13 51	12 14	23 45	11 21	14 98		
21	131	30.6																		

UT	ARIES			VENUS −3.9			MARS −0.1			JUPITER −2.2			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
MONDAY	135 52.3	151 38.9 S	8 15.9	66 21.8 N	24 47.5	128 58.3 N	1 43.0	166 45.3 S	13 52.5	Acamar	315 13.0 S	40 13.0						
	150 54.8	166 38.5	14.6	81 23.5	47.5	144 00.3	43.2	181 47.4	52.4	Achernar	335 21.6 S	57 07.5						
	165 57.3	181 38.1	13.4	96 25.3	47.6	159 02.3	43.4	196 49.6	52.3	Acruhs	173 01.4 S	563 13.4						
	180 59.7	196 37.7	12.2	111 27.1	47.6	174 04.4	43.6	211 51.8	52.2	Adhara	255 06.8 S	29 00.3						
	196 02.2	211 37.2	10.9	126 28.8	47.7	189 06.4	43.8	226 54.0	52.1	Aldebaran	290 41.3 N	16 33.3						
	211 04.7	226 36.8	09.7	141 30.6	47.8	204 08.4	44.0	241 56.1	52.0									
	226 07.1	241 36.4 S	8 08.5	156 32.3 N	24 47.8	219 10.4 N	1 44.2	256 58.3 S	13 51.9	Alioth	166 14.0 N	55 49.8						
	241 09.6	256 36.0	07.2	171 34.1	47.9	234 12.4	44.4	272 00.5	51.8	Alkaid	152 53.1 N	49 11.6						
	256 12.1	271 35.6	06.0	186 35.9	48.0	249 14.4	44.6	287 02.6	51.7	Alnair	27 35.3 S	46 51.1						
	271 14.5	286 35.2	04.8	201 37.6	48.0	264 16.4	44.8	302 04.8	51.6	Alnilam	275 39.1 S	1 11.3						
	286 17.0	301 34.8	03.5	216 39.4	48.1	279 18.5	45.0	317 07.0	51.5	Alphard	217 49.0 S	8 45.6						
	301 19.4	316 34.4	02.3	231 41.1	48.2	294 20.5	45.2	332 09.2	51.4									
	316 21.9	331 34.0 S	8 01.0	246 42.9 N	24 48.2	309 22.5 N	1 45.4	347 11.3 S	13 51.3	Alphecca	126 05.1 N	26 38.0						
	331 24.4	346 33.6	7 59.8	261 44.6	48.3	324 24.5	45.6	2 13.5	51.2	Alpheratz	357 36.7 N	29 13.0						
	346 26.8	1 33.2	58.6	276 46.4	48.3	339 26.5	45.8	17 15.7	51.1	Altair	62 01.8 N	8 55.6						
	1 29.3	16 32.8	57.3	291 48.1	48.4	354 28.5	46.0	32 17.9	51.0	Ankaa	353 09.0 S	42 11.1						
	16 31.8	31 32.4	56.1	306 49.9	48.5	9 30.6	46.2	47 20.0	50.9	Antares	112 17.9 S	26 28.9						
	31 34.2	46 32.0	54.9	321 51.6	48.5	24 32.6	46.4	62 22.2	50.8									
	46 36.7	61 31.6 S	7 53.6	336 53.4 N	24 48.6	39 34.6 N	1 46.6	77 24.4 S	13 50.7	Arcturus	145 49.3 N	19 03.6						
	61 39.2	76 31.2	52.4	351 55.1	48.7	54 36.6	46.8	92 26.6	50.6	Atria	107 13.8 S	69 03.9						
	76 41.6	91 30.8	51.1	6 56.9	48.7	69 38.6	47.0	107 28.7	50.5	Avior	234 14.7 S	59 35.0						
	91 44.1	106 30.4	49.9	21 58.6	48.8	84 40.6	47.2	122 30.9	50.4	Bellatrix	278 24.4 N	6 22.2						
	106 46.6	121 30.0	48.7	37 00.4	48.9	99 42.6	47.4	137 33.1	50.3	Betelgeuse	270 53.6 N	7 24.6						
	121 49.0	136 29.6	47.4	52 02.1	48.9	114 44.6	47.6	152 35.2	50.2									
TUESDAY	136 51.5	151 29.2 S	7 46.2	67 03.9 N	24 49.0	129 46.7 N	1 47.8	167 37.4 S	13 50.1	Canopus	263 52.7 S	52 42.6						
	151 53.9	166 28.8	44.9	82 05.6	49.1	144 48.7	48.0	182 39.6	50.0	Capella	280 24.0 N	46 01.4						
	166 56.4	181 28.4	43.7	97 07.3	49.1	159 50.7	48.2	197 41.8	49.9	Deneb	49 27.3 N	45 21.6						
	181 58.9	196 28.0	42.4	112 09.1	49.2	174 52.7	48.4	212 43.9	49.8	Denebola	182 26.3 N	14 26.5						
	197 01.3	211 27.6	41.2	127 10.8	49.3	189 54.7	48.6	227 46.1	49.7	Diphda	348 49.1 S	17 51.8						
	212 03.8	226 27.2	40.0	142 12.6	49.3	204 56.7	48.8	242 48.3	49.6									
	227 06.3	241 26.8 S	7 38.7	157 14.3 N	24 49.4	219 58.7 N	1 49.0	257 50.5 S	13 49.5	Dubhe	193 42.3 N	61 37.4						
	242 08.7	256 26.4	37.5	172 16.0	49.4	235 00.7	49.2	272 52.6	49.4	Elnath	278 03.6 N	28 37.6						
	257 11.2	271 26.0	36.2	187 17.8	49.5	250 02.8	49.4	287 54.8	49.3	Eltanin	90 43.3 N	51 28.8						
	272 13.7	286 25.6	35.0	202 19.5	49.6	265 04.8	49.6	302 57.0	49.2	Enif	33 40.7 N	9 58.7						
	287 16.1	301 25.2	33.7	217 21.2	49.6	280 06.8	49.8	317 59.1	49.1	Fomalhaut	15 16.6 S	29 30.2						
	302 18.6	316 24.8	32.5	232 23.0	49.7	295 08.8	50.0	333 01.3	49.0									
	317 21.1	331 24.4 S	7 31.3	247 24.7 N	24 49.8	310 10.8 N	1 50.2	348 03.5 S	13 48.9	Gacrux	171 53.0 S	57 14.3						
	332 23.5	346 24.0	30.0	262 26.4	49.8	325 12.8	50.4	3 05.7	48.8	Gienah	175 45.0 S	17 40.2						
	347 26.0	1 23.6	28.8	277 28.2	49.9	340 14.8	50.6	18 07.8	48.7	Hadar	148 38.1 S	60 28.8						
	2 28.4	16 23.2	27.5	292 29.9	50.0	355 16.8	50.8	33 10.0	48.6	Hamal	327 53.1 N	23 34.3						
	17 30.9	31 22.8	26.3	307 31.6	50.0	10 18.9	51.0	48 12.2	48.5	Kaus Aust.	83 34.9 S	34 22.4						
	32 33.4	46 22.4	25.0	322 33.4	50.1	25 20.9	51.2	63 14.4	48.4									
	47 35.8	61 22.0 S	7 23.8	337 35.1 N	24 50.2	40 22.9 N	1 51.4	78 16.5 S	13 48.3	Kochab	137 19.7 N	74 03.3						
	62 38.3	76 21.6	22.5	352 36.8	50.2	55 24.9	51.6	93 18.7	48.2	Markab	13 31.8 N	15 19.7						
	77 40.8	91 21.2	21.3	7 38.5	50.3	70 26.9	51.8	108 20.9	48.1	Menkar	314 07.8 N	4 10.7						
	92 43.2	106 20.8	20.0	22 40.3	50.4	85 28.9	52.0	123 23.1	48.0	Menkent	147 59.4 S	36 28.9						
	107 45.7	121 20.4	18.8	37 42.0	50.4	100 30.9	52.2	138 25.2	47.9	Miaplacidus	221 37.7 S	69 48.6						
	122 48.2	136 20.0	17.5	52 43.7	50.5	115 32.9	52.4	153 27.4	47.8									
WEDNESDAY	137 50.6	151 19.7 S	7 16.3	67 45.4 N	24 50.6	130 34.9 N	1 52.6	168 29.6 S	13 47.7	Mirfak	308 30.5 N	49 56.7						
	152 53.1	166 19.3	15.0	82 47.2	50.6	145 36.9	52.8	183 31.7	47.6	Nunki	75 50.0 S	26 16.1						
	167 55.5	181 18.9	13.8	97 48.9	50.7	160 39.0	53.0	198 33.9	47.5	Peacock	53 08.8 S	56 39.7						
	182 58.0	196 18.5	12.5	112 50.6	50.8	175 41.0	53.2	213 36.1	47.4	Pollux	243 18.9 N	27 58.2						
	198 00.5	211 18.1	11.3	127 52.3	50.8	190 43.0	53.4	228 38.3	47.3	Procyon	244 52.2 N	5 09.9						
	213 02.9	226 17.7	10.0	142 54.0	50.9	205 45.0	53.6	243 40.4	47.2									
	228 05.4	241 17.3 S	7 08.8	157 55.8 N	24 51.0	220 47.0 N	1 53.8	258 42.6 S	13 47.1	Rasalhague	96 00.2 N	12 32.4						
	243 07.9	256 16.9	07.5	172 57.5	51.0	235 49.0	54.0	273 44.8	47.0	Regulus	207 35.8 N	11 51.2						
	258 10.3	271 16.5	06.3	187 59.2	51.1	250 51.0	54.2	288 47.0	46.9	Rigel	281 05.2 S	8 10.6						
	273 12.8	286 16.1	05.0	203 00.9	51.2	265 53.0	54.4	303 49.1	46.8	Rigel Kent.	139 42.4 S	60 55.5						
	288 15.3	301 15.8	03.8	218 02.6	51.2	280 55.0	54.6	318 51.3	46.7	Sabik	102 04.8 S	15 45.2						
	303 17.7	316 15.4	02.5	233 04.3	51.3	295 57.0	54.8	333 53.5	46.6									
	318 20.2	331 15.0 S	7 01.3	248 06.0 N	24 51.4	310 59.0 N	1 55.0	348 55.6 S	13 46.5	Schedar	349 33.2 N	56 40.0						
	333 22.7	346 14.6	7 00.0	263 07.7	51.4	326 01.0	55.2	3 57.8	46.4	Shaula	96 12.8 S	37 07.1						
	348 25.1	1 14.2	6 58.8	278 09.5	51.5	341 03.1	55.5	19 00.0	46.3	Sirius	258 27.3 S	16 45.0						
	3 27.6	16 13.8	57.5	293 11.2	51.6	356 05.1	55.7	34 02.2	46.2	Spica	158 23.8 S	11 16.9						
	18 30.0	31 13.4	56.3	308 12.9	51.6	11 07.1	55.9	49 04.3	46.1	Suhail	222 47.0 S	43 31.5						
	33 32.5	46 13.0	55.0	323 14.6	51.7	26 09.1	56.1	64 06.5	46.0									
	48 35.0	61 12.7 S	6 53.7	338 16.3 N	24 51.7	41 11.1 N	1 56.3	79 08.7 S	13 45.9	Vega	80 34.6 N	38 48.1						
	63 37.4	76 12.3	52.5	353 18.0	51.8	56 13.1	56.5	94 10.8	45.8	Zuben'ubi	136 57.7 S	16 08.2						
	78 39.9	91 11.9	51.2	8 19.7	51.9	71 15.1	56.7	109 13.0	45.7									
	93 42.4	106 11.5	50.0	23 21.4	51.9	86 17.1	56.9	124 15.2	45.6									
	108 44.8	121 11.1	48.7	38 23.1	52.0	101 19.1	57.1	139 17.4	45.5	Venus	14 37.7	13 54						
	123 47.3	136 10.7	47.5	53 24.8	52.1	116 21.1	57.3	154 19.5	45.4	Mars	290 12.4	19 29						
		h m																
Mer. Pass. 14		50.1		v −0.4 d 1.2		v 1.7 d 0.1		v 2.0 d 0.2		v 2.2 d 0.1		Jupiter		352 55.2 15 19				
												Saturn		30 45.9 12 48				

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
	GHA	Dec	GHA	Dec	d	HP	Naut.	Civil		6	7		8	9						
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m					
MONDAY	6 00	176 30.5	S15 46.0	352 24.6	13.8	N19 37.7	10.1	54.1	N 72	06 48	08 13	09 45	14 14	17 05	19 12	21 12				
	01	191 30.4	45.2	6 57.4	13.8	19 27.6	10.2	54.1	N 70	06 43	07 58	09 15	15 12	17 26	19 21	21 12				
	02	206 30.4	44.4	21 30.2	13.9	19 17.4	10.2	54.1	68	06 38	07 46	08 53	15 46	17 42	19 28	21 11				
	03	221 30.3	43.7	36 03.1	14.0	19 07.2	10.3	54.1	66	06 34	07 36	08 36	16 10	17 55	19 34	21 11				
	04	236 30.3	42.9	50 36.1	14.0	18 56.9	10.4	54.1	64	06 31	07 28	08 22	16 29	18 06	19 39	21 11				
	05	251 30.2	42.1	65 09.1	14.1	18 46.5	10.5	54.1	62	06 27	07 20	08 10	16 44	18 15	19 43	21 11				
	06	266 30.2	S15 41.4	79 42.2	14.1	N18 36.0	10.5	54.1	60	06 24	07 14	08 00	16 57	18 23	19 47	21 10				
	07	281 30.2	40.6	94 15.3	14.2	18 25.5	10.7	54.1	N 58	06 22	07 08	07 51	17 08	18 30	19 50	21 10				
	08	296 30.1	39.8	108 48.5	14.2	18 14.8	10.7	54.1	56	06 19	07 03	07 43	17 17	18 36	19 53	21 10				
	09	311 30.1	39.1	123 21.7	14.3	18 04.1	10.8	54.1	54	06 17	06 59	07 37	17 26	18 41	19 56	21 10				
	10	326 30.0	38.3	137 55.0	14.3	17 53.3	10.8	54.1	52	06 14	06 55	07 30	17 33	18 46	19 58	21 10				
	11	341 30.0	37.5	152 28.3	14.4	17 42.5	11.0	54.1	50	06 12	06 51	07 25	17 40	18 50	20 00	21 10				
	12	356 29.9	S15 36.8	167 01.7	14.4	N17 31.5	11.0	54.1	45	06 07	06 42	07 13	17 54	19 00	20 05	21 10				
	13	11 29.9	36.0	181 35.1	14.5	17 20.5	11.0	54.1	N 40	06 02	06 35	07 03	18 06	19 07	20 08	21 10				
	14	26 29.9	35.2	196 08.6	14.6	17 09.5	11.2	54.2	35	05 58	06 28	06 54	18 16	19 14	20 12	21 09				
	15	41 29.8	34.5	210 42.2	14.6	16 58.3	11.2	54.2	30	05 53	06 22	06 47	18 25	19 20	20 15	21 09				
	16	56 29.8	33.7	225 15.8	14.6	16 47.1	11.3	54.2	20	05 44	06 11	06 33	18 40	19 30	20 20	21 09				
	17	71 29.7	32.9	239 49.4	14.7	16 35.8	11.4	54.2	N 10	05 35	06 00	06 22	18 53	19 39	20 24	21 09				
	18	86 29.7	S15 32.1	254 23.1	14.7	N16 24.4	11.4	54.2	0	05 24	05 49	06 11	19 05	19 47	20 28	21 09				
	19	101 29.7	31.4	268 56.8	14.8	16 13.0	11.5	54.2	S 10	05 12	05 38	05 59	19 17	19 55	20 32	21 09				
	20	116 29.6	30.6	283 30.6	14.8	16 01.5	11.6	54.2	20	04 57	05 24	05 47	19 30	20 04	20 37	21 09				
	21	131 29.6	29.8	298 04.4	14.9	15 49.9	11.6	54.2	30	04 38	05 08	05 33	19 44	20 14	20 42	21 09				
	22	146 29.6	29.0	312 38.3	14.9	15 38.3	11.7	54.2	35	04 25	04 58	05 25	19 53	20 20	20 44	21 09				
23	161 29.5	28.3	327 12.2	15.0	15 26.6	11.8	54.2	40	04 11	04 47	05 16	20 02	20 26	20 48	21 09					
TUESDAY	7 00	176 29.5	S15 27.5	341 46.2	15.0	N15 14.8	11.8	54.2	45	03 52	04 32	05 05	20 13	20 33	20 51	21 08				
	01	191 29.4	26.7	356 20.2	15.1	15 03.0	11.9	54.3	S 50	03 28	04 15	04 52	20 27	20 42	20 56	21 08				
	02	206 29.4	25.9	10 54.3	15.1	14 51.1	12.0	54.3	52	03 15	04 06	04 45	20 33	20 46	20 58	21 08				
	03	221 29.4	25.2	25 28.4	15.1	14 39.1	12.0	54.3	54	03 01	03 57	04 39	20 40	20 51	21 00	21 08				
	04	236 29.3	24.4	40 02.5	15.2	14 27.1	12.1	54.3	56	02 44	03 46	04 31	20 48	20 56	21 02	21 08				
	05	251 29.3	23.6	54 36.7	15.2	14 15.0	12.1	54.3	S 60	01 52	03 18	04 12	21 06	21 08	21 08	21 08				
	06	266 29.3	S15 22.8	69 10.9	15.3	N14 02.9	12.2	54.3	Lat.		Sunset		Twilight		Moonset					
	07	281 29.2	22.0	83 45.2	15.3	13 50.7	12.2	54.3					Civil		Naut.		6	7	8	9
	08	296 29.2	21.3	98 19.5	15.4	13 38.5	12.3	54.3									h	m	h	m
	09	311 29.2	20.5	112 53.9	15.3	13 26.2	12.4	54.3									h	m	h	m
	10	326 29.1	19.7	127 28.2	15.5	13 13.8	12.4	54.3									h	m	h	m
	11	341 29.1	18.9	142 02.7	15.4	13 01.4	12.5	54.4	N 72	14 45	16 17	17 42	11 53	10 33	09 52	09 20				
	12	356 29.1	S15 18.1	156 37.1	15.5	N12 48.9	12.5	54.4	N 70	15 15	16 32	17 47	10 53	10 09	09 41	09 17				
	13	11 29.0	17.4	171 11.6	15.6	12 36.4	12.6	54.4	68	15 36	16 43	17 51	10 18	09 51	09 32	09 14				
	14	26 29.0	16.6	185 46.2	15.5	12 23.8	12.7	54.4	66	15 54	16 53	17 55	09 53	09 37	09 24	09 12				
	15	41 29.0	15.8	200 20.7	15.7	12 11.1	12.6	54.4	64	16 08	17 02	17 59	09 33	09 25	09 17	09 10				
	16	56 28.9	15.0	214 55.4	15.6	11 58.5	12.8	54.4	62	16 19	17 09	18 02	09 17	09 14	09 11	09 08				
	17	71 28.9	14.2	229 30.0	15.7	11 45.7	12.8	54.4	60	16 29	17 15	18 05	09 03	09 05	09 06	09 07				
	18	86 28.9	S15 13.5	244 04.7	15.7	N11 32.9	12.8	54.4	N 58	16 38	17 21	18 07	08 52	08 58	09 02	09 05				
	19	101 28.8	12.7	258 39.4	15.7	11 20.1	12.9	54.4	56	16 45	17 26	18 10	08 41	08 51	08 58	09 04				
	20	116 28.8	11.9	273 14.1	15.8	11 07.2	12.9	54.5	54	16 52	17 30	18 12	08 32	08 44	08 54	09 03				
	21	131 28.8	11.1	287 48.9	15.8	10 54.3	13.0	54.5	52	16 58	17 34	18 14	08 24	08 39	08 51	09 02				
	22	146 28.7	10.3	302 23.7	15.8	10 41.3	13.0	54.5	50	17 04	17 38	18 17	08 17	08 34	08 48	09 01				
23	161 28.7	09.5	316 58.5	15.9	10 28.3	13.1	54.5	45	17 16	17 47	18 22	08 01	08 23	08 41	08 59					
WEDNESDAY	8 00	176 28.7	S15 08.7	331 33.4	15.8	N10 15.2	13.1	54.5	N 40	17 26	17 54	18 26	07 48	08 13	08 36	08 57				
	01	191 28.7	08.0	346 08.2	16.0	10 02.1	13.2	54.5	35	17 34	18 01	18 31	07 37	08 05	08 31	08 56				
	02	206 28.6	07.2	0 43.2	15.9	9 48.9	13.2	54.5	30	17 42	18 07	18 35	07 27	07 58	08 27	08 54				
	03	221 28.6	06.4	15 18.1	15.9	9 35.7	13.2	54.5	20	17 55	18 18	18 44	07 11	07 46	08 20	08 52				
	04	236 28.6	05.6	29 53.0	16.0	9 22.5	13.3	54.6	N 10	18 07	18 28	18 53	06 56	07 35	08 13	08 50				
	05	251 28.5	04.8	44 28.0	16.0	9 09.2	13.3	54.6	0	18 18	18 39	19 04	06 42	07 25	08 07	08 48				
	06	266 28.5	S15 04.0	59 03.0	16.1	N 8 55.9	13.4	54.6	S 10	18 29	18 50	19 16	06 28	07 15	08 01	08 46				
	07	281 28.5	03.2	73 38.1	16.0	8 42.5	13.4	54.6	20	18 40	19 04	19 31	06 13	07 04	07 54	08 43				
	08	296 28.5	02.4	88 13.1	16.1	8 29.1	13.4	54.6	30	18 54	19 20	19 50	05 56	06 52	07 46	08 41				
	09	311 28.4	01.6	102 48.2	16.1	8 15.7	13.5	54.6	35	19 02	19 29	20 02	05 46	06 44	07 42	08 40				
	10	326 28.4	00.9	117 23.3	16.1	8 02.2	13.5	54.6	40	19 11	19 41	20 17	05 34	06 36	07 37	08 38				
	11	341 28.4	15 00.1	131 58.4	16.1	7 48.7	13.6	54.7	45	19 22	19 55	20 35	05 20	06 26	07 31	08 36				
	12	356 28.4	S14 59.3	146 33.5	16.1	N 7 35.1	13.6	54.7	S 50	19 35	20 12	20 59	05 03	06 14	07 24	08 34				
	13	11 28.3	58.5	161 08.6	16.2	7 21.5	13.6	54.7	52	19 42	20 20	21 11	04 55	06 08	07 21	08 32				
	14	26 28.3	57.7	175 43.8	16.2	7 07.9	13.6	54.7	54	19 48	20 30	21 25	04 46	06 02	07 17	08 31				
	15	41 28.3	56.9	190 19.0	16.2	6 54.3	13.7	54.7	56	19 56	20 40	21 42	04 36	05 55	07 13	08 30				
	16	56 28.3	56.1	204 54.2	16.2	6 40.6	13.8	54.7	58	20 04	20 53	22 03	04 25	05 47	07 08	08 29				
	17	71 28.2	55.3	219 29.4	16.2	6 26.8	13.7	54.7	S 60	20 14	21 08	22 31	04 11	05 38	07 03	08 27				
	18	86 28.2	S14 54.5	234 04.6	16.2	N 6 13.1	13.8	54.8	Day		SUN		MOON							
	19	101 28.2	53.7	248 39.8	16.2	5 59.3	13.8	54.8	Eqn. of Time		Mer.		Mer. Pass.		Age Phase					
	20	116 28.2	52.9	263 15.0	16.3	5 45.5	13.8	54.8	00 ^h		12 ^h		Upper Lower							
	21	131 28.2	52.1	277 50.3	16.2	5 31.7														

UT	ARIES		VENUS −3.9		MARS +0.0		JUPITER −2.1		SATURN +0.8		STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
T H U R S D A Y	9 00	138 49.8	151 10.3 S	6 46.2	68 26.5 N24	52.1	131 23.1 N	1 57.5	169 21.7 S13	45.3	Acamar	315 13.0 S40	13.0
	01	153 52.2	166 10.0	45.0	83 28.2	52.2	146 25.1	57.7	184 23.9	45.2	Achernar	335 21.6 S57	07.5
	02	168 54.7	181 09.6	43.7	98 29.9	52.3	161 27.1	57.9	199 26.1	45.1	Acruhr	173 01.3 S63	13.4
	03	183 57.1	196 09.2	42.4	113 31.6	52.3	176 29.1	58.1	214 28.2	45.0	Adhara	255 06.8 S29	00.3
	04	198 59.6	211 08.8	41.2	128 33.3	52.4	191 31.2	58.3	229 30.4	44.9	Aldebaran	290 41.3 N16	33.3
	05	214 02.1	226 08.4	39.9	143 35.0	52.5	206 33.2	58.5	244 32.6	44.8			
	06	229 04.5	241 08.0 S	6 38.7	158 36.7 N24	52.6	221 35.2 N	1 58.7	259 34.7 S13	44.6	Alioth	166 14.0 N55	49.8
	07	244 07.0	256 07.7	37.4	173 38.4	52.6	236 37.2	58.9	274 36.9	44.5	Alkaid	152 53.1 N49	11.6
	08	259 09.5	271 07.3	36.1	188 40.1	52.7	251 39.2	59.1	289 39.1	44.4	Alnair	27 35.3 S46	51.1
	09	274 11.9	286 06.9	34.9	203 41.8	52.8	266 41.2	59.3	304 41.3	44.3	Alnilam	275 39.1 S 1	11.1
	10	289 14.4	301 06.5	33.6	218 43.5	52.8	281 43.2	59.5	319 43.4	44.2	Alphard	217 49.0 S 8	45.6
	11	304 16.9	316 06.1	32.4	233 45.2	52.9	296 45.2	59.7	334 45.6	44.1			
	12	319 19.3	331 05.8 S	6 31.1	248 46.9 N24	53.0	311 47.2 N	1 59.9	349 47.8 S13	44.0	Alphecca	126 05.1 N26	38.0
	13	334 21.8	346 05.4	29.8	263 48.5	53.0	326 49.2	2 00.1	4 50.0	43.9	Alpheratz	357 36.7 N29	13.0
	14	349 24.3	1 05.0	28.6	278 50.2	53.1	341 51.2	00.3	19 52.1	43.8	Altair	62 01.8 N 8	55.6
	15	4 26.7	16 04.6	27.3	293 51.9	53.2	356 53.2	00.5	34 54.3	43.7	Ankaa	353 09.0 S42	11.1
	16	19 29.2	31 04.2	26.1	308 53.6	53.2	11 55.2	00.7	49 56.5	43.6	Antares	112 17.9 S26	28.9
	17	34 31.6	46 03.9	24.8	323 55.3	53.3	26 57.2	01.0	64 58.6	43.5			
	18	49 34.1	61 03.5 S	6 23.5	338 57.0 N24	53.4	41 59.2 N	2 01.2	80 00.8 S13	43.4	Arcturus	145 49.3 N19	03.6
	19	64 36.6	76 03.1	22.3	353 58.7	53.4	57 01.2	01.4	95 03.0	43.3	Atria	107 13.8 S69	03.9
	20	79 39.0	91 02.7	21.0	9 00.4	53.5	72 03.2	01.6	110 05.2	43.2	Avior	234 14.8 S59	35.0
	21	94 41.5	106 02.4	19.7	24 02.0	53.6	87 05.2	01.8	125 07.3	43.1	Bellatrix	278 24.4 N 6	22.2
	22	109 44.0	121 02.0	18.5	39 03.7	53.6	102 07.2	02.0	140 09.5	43.0	Betelgeuse	270 53.6 N 7	24.6
	23	124 46.4	136 01.6	17.2	54 05.4	53.7	117 09.2	02.2	155 11.7	42.9			
	F R I D A Y	10 00	139 48.9	151 01.2 S	6 16.0	69 07.1 N24	53.8	132 11.2 N	2 02.4	170 13.8 S13	42.8	Canopus	263 52.7 S52
01		154 51.4	166 00.8	14.7	84 08.8	53.8	147 13.2	02.6	185 16.0	42.7	Capella	280 24.0 N46	01.4
02		169 53.8	181 00.5	13.4	99 10.4	53.9	162 15.2	02.8	200 18.2	42.6	Deneb	49 27.3 N45	21.6
03		184 56.3	196 00.1	12.2	114 12.1	54.0	177 17.2	03.0	215 20.4	42.5	Denebola	182 26.3 N14	26.5
04		199 58.7	210 59.7	10.9	129 13.8	54.0	192 19.2	03.2	230 22.5	42.4	Diphda	348 49.1 S17	51.8
05		215 01.2	225 59.3	09.6	144 15.5	54.1	207 21.2	03.4	245 24.7	42.3			
06		230 03.7	240 59.0 S	6 08.4	159 17.1 N24	54.2	222 23.3 N	2 03.6	260 26.9 S13	42.2	Dubhe	193 42.3 N61	37.5
07		245 06.1	255 58.6	07.1	174 18.8	54.2	237 25.3	03.8	275 29.1	42.1	Elnath	278 03.7 N28	37.6
08		260 08.6	270 58.2	05.8	189 20.5	54.3	252 27.3	04.0	290 31.2	42.0	Eltanin	90 43.3 N51	28.8
09		275 11.1	285 57.8	04.6	204 22.2	54.4	267 29.3	04.2	305 33.4	41.9	Enif	33 40.7 N 9	58.7
10		290 13.5	300 57.5	03.3	219 23.8	54.4	282 31.3	04.4	320 35.6	41.8	Fomalhaut	15 16.6 S29	30.2
11		305 16.0	315 57.1	02.0	234 25.5	54.5	297 33.3	04.6	335 37.7	41.7			
12		320 18.5	330 56.7 S	6 00.8	249 27.2 N24	54.6	312 35.3 N	2 04.8	350 39.9 S13	41.6	Gacrux	171 53.0 S57	14.3
13		335 20.9	345 56.4	5 59.5	264 28.9	54.6	327 37.3	05.1	5 42.1	41.5	Gienah	175 45.0 S17	40.2
14		350 23.4	0 56.0	58.2	279 30.5	54.7	342 39.3	05.3	20 44.3	41.4	Hadar	148 38.1 S60	28.8
15		5 25.9	15 55.6	57.0	294 32.2	54.8	357 41.3	05.5	35 46.4	41.3	Hamal	327 53.1 N23	34.3
16		20 28.3	30 55.2	55.7	309 33.9	54.8	12 43.3	05.7	50 48.6	41.2	Kaus Aust.	83 34.9 S34	22.4
17		35 30.8	45 54.9	54.4	324 35.5	54.9	27 45.3	05.9	65 50.8	41.1			
18		50 33.2	60 54.5 S	5 53.2	339 37.2 N24	55.0	42 47.3 N	2 06.1	80 52.9 S13	41.0	Kochab	137 19.6 N74	03.3
19		65 35.7	75 54.1	51.9	354 38.9	55.0	57 49.3	06.3	95 55.1	40.9	Markab	13 31.8 N15	19.6
20		80 38.2	90 53.8	50.6	9 40.5	55.1	72 51.3	06.5	110 57.3	40.8	Menkar	314 07.8 N 4	10.7
21		95 40.6	105 53.4	49.4	24 42.2	55.2	87 53.3	06.7	125 59.5	40.7	Menkent	147 59.4 S36	28.9
22		110 43.1	120 53.0	48.1	39 43.8	55.3	102 55.3	06.9	141 01.6	40.6	Miaplacidus	221 37.7 S69	48.7
23		125 45.6	135 52.6	46.8	54 45.5	55.3	117 57.3	07.1	156 03.8	40.5			
S A T U R D A Y		11 00	140 48.0	150 52.3 S	5 45.5	69 47.2 N24	55.4	132 59.3 N	2 07.3	171 06.0 S13	40.4	Mirfak	308 30.5 N49
	01	155 50.5	165 51.9	44.3	84 48.8	55.5	148 01.3	07.5	186 08.1	40.3	Nunki	75 50.0 S26	16.1
	02	170 53.0	180 51.5	43.0	99 50.5	55.5	163 03.3	07.7	201 10.3	40.2	Peacock	53 08.8 S56	39.7
	03	185 55.4	195 51.2	41.7	114 52.1	55.6	178 05.3	07.9	216 12.5	40.1	Pollux	243 18.9 N27	58.2
	04	200 57.9	210 50.8	40.5	129 53.8	55.7	193 07.3	08.1	231 14.7	40.0	Procyon	244 52.2 N 5	09.9
	05	216 00.4	225 50.4	39.2	144 55.5	55.7	208 09.3	08.3	246 16.8	39.9			
	06	231 02.8	240 50.1 S	5 37.9	159 57.1 N24	55.8	223 11.3 N	2 08.5	261 19.0 S13	39.8	Rasalhague	96 00.2 N12	32.4
	07	246 05.3	255 49.7	36.6	174 58.8	55.9	238 13.3	08.8	276 21.2	39.7	Regulus	207 35.8 N11	51.2
	08	261 07.7	270 49.3	35.4	190 00.4	55.9	253 15.3	09.0	291 23.3	39.6	Rigel	281 05.2 S 8	10.6
	09	276 10.2	285 49.0	34.1	205 02.1	56.0	268 17.3	09.2	306 25.5	39.5	Rigel Kent.	139 42.4 S60	55.5
	10	291 12.7	300 48.6	32.8	220 03.7	56.1	283 19.3	09.4	321 27.7	39.4	Sabik	102 04.8 S15	45.2
	11	306 15.1	315 48.2	31.6	235 05.4	56.1	298 21.3	09.6	336 29.9	39.3			
	12	321 17.6	330 47.9 S	5 30.3	250 07.0 N24	56.2	313 23.3 N	2 09.8	351 32.0 S13	39.2	Schedar	349 33.2 N56	39.9
	13	336 20.1	345 47.5	29.0	265 08.7	56.3	328 25.2	10.0	6 34.2	39.1	Shaula	96 12.7 S37	07.1
	14	351 22.5	0 47.1	27.7	280 10.3	56.3	343 27.2	10.2	21 36.4	39.0	Sirius	258 27.4 S16	45.0
	15	6 25.0	15 46.8	26.5	295 12.0	56.4	358 29.2	10.4	36 38.6	38.9	Spica	158 23.8 S11	16.9
	16	21 27.5	30 46.4	25.2	310 13.6	56.5	13 31.2	10.6	51 40.7	38.8	Suhail	222 47.0 S43	31.6
	17	36 29.9	45 46.0	23.9	325 15.3	56.5	28 33.2	10.8	66 42.9	38.7			
	18	51 32.4	60 45.7 S	5 22.6	340 16.9 N24	56.6	43 35.2 N	2 11.0	81 45.1 S13	38.6	Vega	80 34.6 N38	48.0
	19	66 34.8	75 45.3	21.4	355 18.6	56.7	58 37.2	11.2	96 47.2	38.5	Zuben'ubi	136 57.7 S16	08.2
	20	81 37.3	90 44.9	20.1	10 20.2	56.8	73 39.2	11.4	111 49.4	38.4			
	21	96 39.8	105 44.6	18.8	25 21.9	56.8	88 41.2	11.6	126 51.6	38.3			
	22	111 42.2	120 44.2	17.5	40 23.5	56.9	103 43.2	11.9	141 53.8	38.2			
	23	126 44.7	135 43.9	16.3	55 25.1	57.0	118 45.2	12.1	156 55.9	38.1			
			h m										
Mer. Pass. 14		38.3	v −0.4 d 1.3	v 1.7 d 0.1	v 2.0 d 0.2	v 2.2 d 0.1							

UT	SUN		MOON					Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	v	Dec	d	HP		Naut.	Civil		9	10	11	12	
d h	° ' "	° ' "	° ' "	' "	° ' "	' "	' "	°	h m	h m	h m	h m	h m	h m	h m	
9	00	176 28.1 S14 49.7	321 36.0 16.3 N	4	50.0 13.9	54.9		N 72	06 36	07 59	09 25	21 12	23 14	25 33	01 33	
	01	191 28.1	48.9	336 11.3 16.2	4	36.1 14.0	54.9	N 70	06 32	07 46	09 00	21 12	23 05	25 09	01 09	
	02	206 28.1	48.1	350 46.5 16.3	4	22.1 14.0	54.9	68	06 29	07 36	08 40	21 11	22 57	24 50	00 50	
	03	221 28.0	47.3	5 21.8 16.3	4	08.1 14.0	54.9	66	06 26	07 27	08 25	21 11	22 50	24 35	00 35	
	04	236 28.0	46.5	19 57.1 16.3	3	54.1 14.1	54.9	64	06 23	07 19	08 12	21 11	22 45	24 24	00 24	
	05	251 28.0	45.7	34 32.4 16.2	3	40.0 14.0	54.9	62	06 20	07 13	08 01	21 11	22 40	24 13	00 13	
	06	266 28.0 S14 44.9	49 07.6 16.3 N	3	26.0 14.1	55.0		60	06 18	07 07	07 52	21 10	22 36	24 05	00 05	
	07	281 28.0	44.1	63 42.9 16.3	3	11.9 14.1	55.0	N 58	06 16	07 02	07 44	21 10	22 32	23 57	25 28	
	08	296 27.9	43.3	78 18.2 16.2	2	57.8 14.1	55.0	56	06 14	06 58	07 37	21 10	22 29	23 51	25 17	
	09	311 27.9	42.5	92 53.4 16.3	2	43.7 14.2	55.0	54	06 12	06 53	07 31	21 10	22 26	23 45	25 08	
	10	326 27.9	41.7	107 28.7 16.3	2	29.5 14.1	55.0	52	06 10	06 50	07 25	21 10	22 24	23 40	25 00	
	11	341 27.9	40.9	122 04.0 16.2	2	15.4 14.2	55.0	50	06 08	06 46	07 20	21 10	22 21	23 35	24 52	
	12	356 27.9 S14 40.1	136 39.2 16.3 N	2	01.2 14.2	55.1		45	06 04	06 38	07 09	21 10	22 16	23 25	24 37	
	13	11 27.9	39.3	151 14.5 16.2	1	47.0 14.2	55.1	N 40	05 59	06 31	06 59	21 10	22 12	23 16	24 24	
	14	26 27.8	38.5	165 49.7 16.2	1	32.8 14.2	55.1	35	05 55	06 25	06 51	21 09	22 08	23 09	24 13	
	15	41 27.8	37.7	180 24.9 16.2	1	18.6 14.2	55.1	30	05 51	06 20	06 44	21 09	22 05	23 03	24 04	
	16	56 27.8	36.9	195 00.1 16.2	1	04.4 14.3	55.1	20	05 43	06 09	06 32	21 09	22 00	22 52	23 48	
	17	71 27.8	36.1	209 35.3 16.2	0	50.1 14.3	55.2	N 10	05 34	05 59	06 21	21 09	21 55	22 43	23 34	
	18	86 27.8 S14 35.3	224 10.5 16.2 N	0	35.8 14.2	55.2		0	05 25	05 49	06 11	21 09	21 50	22 34	23 21	
	19	101 27.8	34.5	238 45.7 16.1	0	21.6 14.3	55.2	S 10	05 13	05 38	06 00	21 09	21 46	22 25	23 08	
	20	116 27.7	33.7	253 20.8 16.2 N	0	07.3 14.3	55.2	20	04 59	05 26	05 49	21 09	21 41	22 16	22 54	
	21	131 27.7	32.9	267 56.0 16.1 S	0	07.0 14.3	55.2	30	04 41	05 11	05 36	21 09	21 36	22 06	22 39	
	22	146 27.7	32.1	282 31.1 16.1	0	21.3 14.3	55.3	35	04 29	05 01	05 28	21 09	21 33	22 00	22 30	
	23	161 27.7	31.3	297 06.2 16.1	0	35.6 14.3	55.3	40	04 15	04 50	05 20	21 09	21 30	21 53	22 19	
10	00	176 27.7 S14 30.5	311 41.3 16.1 S	0	49.9 14.3	55.3		45	03 58	04 37	05 09	21 08	21 26	21 45	22 08	
	01	191 27.7	29.7	326 16.4 16.0	1	04.2 14.4	55.3	S 50	03 35	04 21	04 57	21 08	21 21	21 36	21 53	
	02	206 27.7	28.9	340 51.4 16.0	1	18.6 14.3	55.3	52	03 23	04 13	04 51	21 08	21 19	21 32	21 47	
	03	221 27.7	28.1	355 26.4 16.0	1	32.9 14.3	55.4	54	03 10	04 04	04 45	21 08	21 17	21 27	21 39	
	04	236 27.6	27.2	10 01.4 16.0	1	47.2 14.4	55.4	56	02 54	03 54	04 38	21 08	21 15	21 22	21 31	
	05	251 27.6	26.4	24 36.4 15.9	2	01.6 14.3	55.4	58	02 35	03 42	04 30	21 08	21 12	21 16	21 22	
	06	266 27.6 S14 25.6	39 11.3 16.0 S	2	15.9 14.3	55.4		S 60	02 09	03 28	04 20	21 08	21 09	21 09	21 12	
	07	281 27.6	24.8	53 46.3 15.8	2	30.2 14.4	55.4		Lat.	Sunset	Twilight		Moonset			
	08	296 27.6	24.0	68 21.1 15.9	2	44.6 14.3	55.5				Civil	Naut.	9	10	11	12
	09	311 27.6	23.2	82 56.0 15.8	2	58.9 14.4	55.5									
	10	326 27.6	22.4	97 30.8 15.8	3	13.3 14.3	55.5									
	11	341 27.6	21.6	112 05.6 15.8	3	27.6 14.3	55.5	N 72	15 05	16 31	17 54	09 20	08 50	08 17	07 31	
	12	356 27.6 S14 20.8	126 40.4 15.7 S	3	41.9 14.4	55.5		N 70	15 30	16 44	17 58	09 17	08 54	08 29	07 57	
	13	11 27.6	20.0	141 15.1 15.7	3	56.3 14.3	55.6	68	15 49	16 54	18 01	09 14	08 58	08 39	08 17	
	14	26 27.6	19.1	155 49.8 15.6	4	10.6 14.3	55.6	66	16 05	17 03	18 04	09 12	09 00	08 48	08 34	
	15	41 27.5	18.3	170 24.4 15.7	4	24.9 14.3	55.6	64	16 17	17 10	18 07	09 10	09 03	08 55	08 47	
	16	56 27.5	17.5	184 59.1 15.5	4	39.2 14.3	55.6	62	16 28	17 17	18 09	09 08	09 05	09 02	08 58	
	17	71 27.5	16.7	199 33.6 15.6	4	53.5 14.3	55.7	60	16 37	17 22	18 12	09 07	09 07	09 07	09 08	
	18	86 27.5 S14 15.9	214 08.2 15.4 S	5	07.8 14.3	55.7		N 58	16 45	17 27	18 14	09 05	09 08	09 12	09 17	
	19	101 27.5	15.1	228 42.6 15.5	5	22.1 14.3	55.7	56	16 52	17 32	18 16	09 04	09 10	09 16	09 24	
	20	116 27.5	14.3	243 17.1 15.4	5	36.4 14.3	55.7	54	16 58	17 36	18 18	09 03	09 11	09 20	09 31	
	21	131 27.5	13.4	257 51.5 15.4	5	50.7 14.2	55.8	52	17 04	17 40	18 19	09 02	09 12	09 24	09 37	
	22	146 27.5	12.6	272 25.9 15.3	6	04.9 14.3	55.8	50	17 09	17 43	18 21	09 01	09 13	09 27	09 42	
	23	161 27.5	11.8	287 00.2 15.2	6	19.2 14.2	55.8	45	17 20	17 51	18 25	08 59	09 16	09 34	09 54	
11	00	176 27.5 S14 11.0	301 34.4 15.2 S	6	33.4 14.2	55.8		N 40	17 29	17 58	18 29	08 57	09 18	09 40	10 04	
	01	191 27.5	10.2	316 08.6 15.2	6	47.6 14.2	55.9	35	17 37	18 04	18 33	08 56	09 20	09 45	10 13	
	02	206 27.5	09.3	330 42.8 15.1	7	01.8 14.2	55.9	30	17 44	18 09	18 37	08 54	09 21	09 50	10 20	
	03	221 27.5	8.5	345 16.9 15.1	7	16.0 14.2	55.9	20	17 57	18 19	18 45	08 52	09 24	09 57	10 33	
	04	236 27.5	07.7	359 51.0 15.0	7	30.2 14.1	55.9	N 10	18 07	18 29	18 54	08 50	09 26	10 04	10 45	
	05	251 27.5	06.9	14 25.0 14.9	7	44.3 14.2	56.0	0	18 18	18 39	19 04	08 48	09 29	10 11	10 56	
	06	266 27.5 S14 06.1	28 58.9 14.9 S	7	58.5 14.1	56.0		S 10	18 28	18 50	19 15	08 46	09 31	10 17	11 07	
	07	281 27.5	05.3	43 32.8 14.8	8	12.6 14.0	56.0	20	18 39	19 02	19 29	08 43	09 33	10 25	11 18	
	08	296 27.5	04.4	58 06.6 14.8	8	26.6 14.1	56.0	30	18 52	19 17	19 47	08 41	09 36	10 33	11 32	
	09	311 27.5	03.6	72 40.4 14.7	8	40.7 14.1	56.1	35	18 59	19 26	19 58	08 40	09 38	10 37	11 39	
	10	326 27.5	02.8	87 14.1 14.7	8	54.8 14.0	56.1	40	19 08	19 37	20 12	08 38	09 39	10 43	11 48	
	11	341 27.5	02.0	101 47.8 14.6	9	08.8 14.0	56.1	45	19 18	19 50	20 30	08 36	09 41	10 49	11 59	
	12	356 27.5 S14 01.1	116 21.4 14.5 S	9	22.8 13.9	56.1		S 50	19 30	20 06	20 52	08 34	09 44	10 56	12 11	
	13	11 27.5 14 00.3	130 54.9 14.4	9	36.7 14.0	56.2		52	19 36	20 14	21 03	08 32	09 45	11 00	12 17	
	14	26 27.5 13 59.5	145 28.3 14.4	9	50.7 13.9	56.2		54	19 42	20 23	21 16	08 31	09 46	11 03	12 24	
	15	41 27.5	58.7	160 01.7 14.4	10	04.6 13.8	56.2	56	19 49	20 33	21 32	08 30	09 48	11 08	12 31	
	16	56 27.5	57.9	174 35.1 14.2	10	18.4 13.9	56.2	58	19 57	20 44	21 51	08 29	09 49	11 12	12 40	
	17	71 27.5	57.0	189 08.3 14.2	10	32.3 13.8	56.3	S 60	20 06	20 58	22 15	08 27	09 51	11 18	12 49	
	18	86 27.5 S13 56.2	203 41.5 14.1 S10	46.1 13.8	56.3				SUN		MOON					
	19	101 27.5	55.4	218 14.6 14.1	10	59.9 13.7	56.3	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
	20	116 27.5	54.6	232 47.7 13.9	11	13.6 13.7	56.4		00 ^h	12 ^h		Pass.	Upper			Lower
	21	131 27.5	53.7	247 20.6 13.9	11	27.3 13.7	56.4	d	m s	m s	h m	h m	h m	d	%	
	22	146 27.5	52.9	261 53.5 13.8	11	41.0 13.7	56.4	9	14 08	14 08	12 14	02 38	14 58	19 88		
	23	161 27.5	52.1	276 26.3 13.8 S11	54.7 13.6	56.4	10	14 09	14 10	12 14	03 19	15 39	20 80			

UT	ARIES	VENUS	−3.9	MARS	+0.1	JUPITER	−2.1	SATURN	+0.7	STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
d h	°	°	°	°	°	°	°	°	°		°	°
SUNDAY	12 00	141 47.2	150 43.5 S	5 15.0	70 26.8	N24 57.0	133 47.2 N	2 12.3	171 58.1 S13	37.9	Acamar	315 13.0 S40 13.0
	01	156 49.6	165 43.1	13.7	85 28.4	57.1	148 49.2	12.5	187 00.3	37.8	Achernar	335 21.6 S57 07.5
	02	171 52.1	180 42.8	12.4	100 30.1	57.2	163 51.2	12.7	202 02.4	37.7	Acruz	173 01.3 S63 13.4
	03	186 54.6	195 42.4	11.1	115 31.7	57.2	178 53.2	12.9	217 04.6	37.6	Adhara	255 06.6 S29 00.3
	04	201 57.0	210 42.0	09.9	130 33.3	57.3	193 55.2	13.1	232 06.8	37.5	Aldebaran	290 41.3 N16 33.3
	05	216 59.5	225 41.7	08.6	145 35.0	57.4	208 57.2	13.3	247 09.0	37.4		
	06	232 02.0	240 41.3 S	5 07.3	160 36.6	N24 57.4	223 59.2 N	2 13.5	262 11.1 S13	37.3	Alioth	166 14.0 N55 49.8
	07	247 04.4	255 41.0	06.0	175 38.2	57.5	239 01.2	13.7	277 13.3	37.2	Alkaid	152 53.0 N49 11.6
	08	262 06.9	270 40.6	04.8	190 39.9	57.6	254 03.2	13.9	292 15.5	37.1	Alnair	27 35.3 S46 51.1
	09	277 09.3	285 40.2	03.5	205 41.5	57.6	269 05.2	14.1	307 17.6	37.0	Anilam	275 39.1 S 1 11.1
	10	292 11.8	300 39.9	02.2	220 43.1	57.7	284 07.2	14.3	322 19.8	36.9	Alphard	217 49.0 S 8 45.6
	11	307 14.3	315 39.5	5 00.9	235 44.8	57.8	299 09.2	14.6	337 22.0	36.8		
	12	322 16.7	330 39.2 S	4 59.6	250 46.4	N24 57.9	314 11.2 N	2 14.8	352 24.2 S13	36.7	Alphecca	126 05.1 N26 38.0
	13	337 19.2	345 38.8	58.4	265 48.0	57.9	329 13.2	15.0	7 26.3	36.6	Alpheratz	357 36.7 N29 13.0
	14	352 21.7	0 38.4	57.1	280 49.7	58.0	344 15.2	15.2	22 28.5	36.5	Altair	62 01.8 N 8 55.6
	15	7 24.1	15 38.1	55.8	295 51.3	58.1	359 17.1	15.4	37 30.7	36.4	Ankaa	353 09.0 S42 11.1
	16	22 26.6	30 37.7	54.5	310 52.9	58.1	14 19.1	15.6	52 32.8	36.3	Antares	112 17.9 S26 28.9
	17	37 29.1	45 37.4	53.2	325 54.6	58.2	29 21.1	15.8	67 35.0	36.2		
	18	52 31.5	60 37.0 S	4 52.0	340 56.2	N24 58.3	44 23.1 N	2 16.0	82 37.2 S13	36.1	Arcturus	145 49.7 N19 03.6
	19	67 34.0	75 36.7	50.7	355 57.8	58.3	59 25.1	16.2	97 39.4	36.0	Atria	107 13.2 S69 03.9
	20	82 36.5	90 36.3	49.4	10 59.4	58.4	74 27.1	16.4	112 41.5	35.9	Avior	234 14.8 S59 35.1
	21	97 38.9	105 35.9	48.1	26 01.1	58.5	89 29.1	16.6	127 43.7	35.8	Bellatrix	278 24.4 N 6 22.2
	22	112 41.4	120 35.6	46.8	41 02.7	58.5	104 31.1	16.8	142 45.9	35.7	Betelgeuse	270 53.6 N 7 24.6
23	127 43.8	135 35.2	45.6	56 04.3	58.6	119 33.1	17.0	157 48.0	35.6			
MONDAY	13 00	142 46.3	150 34.9 S	4 44.3	71 05.9	N24 58.7	134 35.1 N	2 17.3	172 50.2 S13	35.5	Canopus	263 52.7 S52 42.7
	01	157 48.8	165 34.5	43.0	86 07.5	58.7	149 37.1	17.5	187 52.4	35.4	Capella	280 24.0 N46 01.4
	02	172 51.2	180 34.2	41.7	101 09.2	58.8	164 39.1	17.7	202 54.6	35.3	Deneb	49 27.3 N45 21.6
	03	187 53.7	195 33.8	40.4	116 10.8	58.9	179 41.1	17.9	217 56.7	35.2	Denebola	182 26.3 N14 26.5
	04	202 56.2	210 33.4	39.1	131 12.4	59.0	194 43.1	18.1	232 58.9	35.1	Diphda	348 49.1 S17 51.8
	05	217 58.6	225 33.1	37.9	146 14.0	59.0	209 45.1	18.3	248 01.1	35.0		
	06	233 01.1	240 32.7 S	4 36.6	161 15.6	N24 59.1	224 47.0 N	2 18.5	263 03.2 S13	34.9	Dubhe	193 42.3 N61 37.5
	07	248 03.6	255 32.4	35.3	176 17.3	59.2	239 49.0	18.7	278 05.4	34.8	Elnath	278 03.7 N28 37.6
	08	263 06.0	270 32.0	34.0	191 18.9	59.2	254 51.0	18.9	293 07.6	34.7	Eltanin	90 43.2 N51 28.8
	09	278 08.5	285 31.7	32.7	206 20.5	59.3	269 53.0	19.1	308 09.8	34.6	Enif	33 40.7 N 9 58.7
	10	293 10.9	300 31.3	31.4	221 22.1	59.4	284 55.0	19.3	323 11.9	34.5	Fomalhaut	15 16.6 S29 30.2
	11	308 13.4	315 31.0	30.2	236 23.7	59.4	299 57.0	19.6	338 14.1	34.4		
	12	323 15.9	330 30.6 S	4 28.9	251 25.3	N24 59.5	314 59.0 N	2 19.8	353 16.3 S13	34.3	Gacrux	171 53.0 S57 14.4
	13	338 18.3	345 30.3	27.6	266 26.9	59.6	330 01.0	20.0	8 18.4	34.2	Gienah	175 45.0 S17 40.2
	14	353 20.8	0 29.9	26.3	281 28.5	59.6	345 03.0	20.2	23 20.6	34.1	Hadar	148 38.0 S60 28.8
	15	8 23.3	15 29.6	25.0	296 30.2	59.7	0 05.0	20.4	38 22.8	34.0	Hamal	327 53.1 N23 34.3
	16	23 25.7	30 29.2	23.7	311 31.8	59.8	15 07.0	20.6	53 25.0	33.9	Kaus Aust.	83 34.9 S34 22.4
	17	38 28.2	45 28.8	22.5	326 33.4	59.8	30 09.0	20.8	68 27.1	33.8		
	18	53 30.7	60 28.5 S	4 21.2	341 35.0	N24 59.9	45 10.9 N	2 21.0	83 29.3 S13	33.7	Kochab	137 19.6 N74 03.3
	19	68 33.1	75 28.1	19.9	356 36.6	25 00.0	60 12.9	21.2	98 31.5	33.6	Markab	13 31.8 N15 19.6
	20	83 35.6	90 27.8	18.6	11 38.2	00.1	75 14.9	21.4	113 33.6	33.5	Menkar	314 07.8 N 4 10.7
	21	98 38.1	105 27.4	17.3	26 39.8	00.1	90 16.9	21.6	128 35.8	33.4	Menkent	147 59.3 S36 28.9
	22	113 40.5	120 27.1	16.0	41 41.4	00.2	105 18.9	21.9	143 38.0	33.3	Miaplacidus	221 37.7 S69 48.7
23	128 43.0	135 26.7	14.7	56 43.0	00.3	120 20.9	22.1	158 40.2	33.2			
TUESDAY	14 00	143 45.4	150 26.4 S	4 13.5	71 44.6	N25 00.3	135 22.9 N	2 22.3	173 42.3 S13	33.1	Mirfak	308 30.5 N49 56.7
	01	158 47.9	165 26.0	12.2	86 46.2	00.4	150 24.9	22.5	188 44.5	33.0	Nunki	75 50.0 S26 16.1
	02	173 50.4	180 25.7	10.9	101 47.8	00.5	165 26.9	22.7	203 46.7	32.9	Peacock	53 08.8 S56 39.7
	03	188 52.8	195 25.3	09.6	116 49.4	00.5	180 28.9	22.9	218 48.8	32.8	Pollux	243 18.9 N27 58.2
	04	203 55.3	210 25.0	08.3	131 51.0	00.6	195 30.8	23.1	233 51.0	32.6	Procyon	244 52.2 N 5 09.9
	05	218 57.8	225 24.6	07.0	146 52.6	00.7	210 32.8	23.3	248 53.2	32.5		
	06	234 00.2	240 24.3 S	4 05.7	161 54.2	N25 00.7	225 34.8 N	2 23.5	263 55.4 S13	32.4	Rasalhague	96 00.2 N12 32.4
	07	249 02.7	255 23.9	04.4	176 55.8	00.8	240 36.8	23.7	278 57.5	32.3	Regulus	207 35.8 N11 51.2
	08	264 05.2	270 23.6	03.1	191 57.4	00.9	255 38.8	23.9	293 59.7	32.2	Rigel	281 05.2 S 8 10.6
	09	279 07.6	285 23.2	01.9	206 59.0	01.0	270 40.8	24.2	309 01.9	32.1	Rigel Kent.	139 42.3 S60 55.5
	10	294 10.1	300 22.9	4 00.6	222 00.6	01.0	285 42.8	24.4	324 04.0	32.0	Sabik	102 04.7 S15 45.2
	11	309 12.6	315 22.6	3 59.3	237 02.2	01.1	300 44.8	24.6	339 06.2	31.9		
	12	324 15.0	330 22.2 S	3 58.0	252 03.8	N25 01.2	315 46.8 N	2 24.8	354 08.4 S13	31.8	Schedar	349 33.2 N56 39.9
	13	339 17.5	345 21.9	56.7	267 05.4	01.2	330 48.7	25.0	9 10.6	31.7	Shaula	96 12.7 S37 07.1
	14	354 19.9	0 21.5	55.4	282 07.0	01.3	345 50.7	25.2	24 12.7	31.6	Sirius	258 27.4 S16 45.0
	15	9 22.4	15 21.2	54.1	297 08.6	01.4	0 52.7	25.4	39 14.9	31.5	Spica	158 23.8 S11 16.9
	16	24 24.9	30 20.8	52.8	312 10.2	01.4	15 54.7	25.6	54 17.1	31.4	Suhail	222 47.0 S43 31.6
	17	39 27.3	45 20.5	51.5	327 11.7	01.5	30 56.7	25.8	69 19.2	31.3		
	18	54 29.8	60 20.1 S	3 50.3	342 13.3	N25 01.6	45 58.7 N	2 26.1	84 21.4 S13	31.2	Vega	80 34.6 N38 48.0
	19	69 32.3	75 19.8	49.0	357 14.9	01.6	61 00.7	26.3	99 23.6	31.1	Zuben'ubi	136 57.7 S16 08.2
	20	84 34.7	90 19.4	47.7	12 16.5	01.7	76 02.7	26.5	114 25.8	31.0		
	21	99 37.2	105 19.1	46.4	27 18.1	01.8	91 04.6	26.7	129 27.9	30.9		
	22	114 39.7	120 18.7	45.1	42 19.7	01.8	106 06.6	26.9	144 30.1	30.8	Venus	SHA 48.6 Mer.Pass. 13 58
23	129 42.1	135 18.4	43.8	57 21.3	01.9	121 08.6	27.1	159 32.3	30.7	Mars	288 19.6 19 14	
	h m									Jupiter	351 48.8 15 00	
Mer.Pass. 14	26.5	v −0.4 d 1.3		v 1.6 d 0.1		v 2.0 d 0.2		v 2.2 d 0.1		Saturn	30 03.9 12 27	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	12	13	14	15		
d h																				
SUNDAY	12 00	176	27.5	S13	51.2	290	59.1	13.6	S12	08.3	13.5	56.5	N 72	06 24	07 45	09 07	01 33	03 48	05 05	06 22
	01	191	27.5		50.4	305	31.7	13.6	12	21.8	13.5	56.5	N 70	06 21	07 34	08 45	01 09	03 03	04 20	05 37
	02	206	27.5		49.6	320	04.3	13.5	12	35.3	13.5	56.5	66	06 17	07 17	08 14	00 35	02 34	04 05	05 22
	03	221	27.5		48.8	334	36.8	13.4	12	48.8	13.5	56.6	64	06 15	07 11	08 02	00 24	02 12	04 16	05 33
	04	236	27.5		47.9	349	09.2	13.3	13	02.3	13.3	56.6	62	06 13	07 05	07 53	00 13	01 54	03 45	05 02
	05	251	27.5		47.1	3	41.5	13.3	13	15.6	13.4	56.6	60	06 11	07 00	07 44	00 05	01 40	03 22	04 39
	06	266	27.5	S13	46.3	18	13.8	13.1	S13	29.0	13.3	56.6	N 58	06 09	06 55	07 37	25 28	01 28	03 04	04 21
	07	281	27.5		45.4	32	45.9	13.1	13	42.3	13.2	56.7	56	06 08	06 51	07 30	25 17	01 17	02 48	04 05
	08	296	27.5		44.6	47	18.0	13.0	13	55.5	13.2	56.7	54	06 06	06 48	07 25	25 08	01 08	02 35	04 02
	09	311	27.5		43.8	61	50.0	12.9	14	08.7	13.2	56.7	52	06 05	06 44	07 19	25 00	01 00	02 23	03 48
	10	326	27.5		43.0	76	21.9	12.8	14	21.9	13.1	56.8	50	06 03	06 41	07 15	24 52	00 52	02 13	03 35
	11	341	27.5		42.1	90	53.7	12.7	14	35.0	13.0	56.8	45	06 00	06 34	07 04	24 37	00 37	01 52	03 08
	12	356	27.5	S13	41.3	105	25.4	12.6	S14	48.0	13.0	56.8	N 40	05 56	06 28	06 56	24 24	00 24	01 35	02 47
	13	11	27.5		40.5	119	57.0	12.5	15	01.0	12.9	56.9	35	05 53	06 22	06 48	24 13	00 13	01 20	02 30
	14	26	27.5		39.6	134	28.5	12.4	15	13.9	12.9	56.9	30	05 49	06 17	06 42	24 04	00 04	01 08	02 15
	15	41	27.5		38.8	148	59.9	12.4	15	26.8	12.8	56.9	20	05 42	06 08	06 30	23 48	24 47	00 47	01 50
	16	56	27.6		38.0	163	31.3	12.2	15	39.6	12.8	56.9	N 10	05 34	05 59	06 20	23 34	24 29	00 29	01 28
	17	71	27.6		37.1	178	02.5	12.1	15	52.4	12.7	57.0	0	05 25	05 49	06 11	23 21	24 12	00 12	01 08
	18	86	27.6	S13	36.3	192	33.6	12.0	S16	05.1	12.6	57.0	S 10	05 14	05 39	06 01	23 08	23 55	24 48	00 48
	19	101	27.6		35.5	207	04.6	12.0	16	17.7	12.6	57.0	20	05 01	05 28	05 51	22 54	23 37	24 27	00 27
	20	116	27.6		34.6	221	35.6	11.8	16	30.3	12.5	57.1	30	04 44	05 13	05 38	22 39	23 17	24 03	00 03
	21	131	27.6		33.8	236	06.4	11.7	16	42.8	12.4	57.1	35	04 33	05 05	05 31	22 30	23 05	23 48	24 41
	22	146	27.6		33.0	250	37.1	11.6	16	55.2	12.4	57.1	40	04 19	04 54	05 23	22 19	22 51	23 32	24 23
	23	161	27.6		32.1	265	07.7	11.5	17	07.6	12.3	57.2	45	04 03	04 42	05 14	22 08	22 35	23 12	24 01
	MONDAY	13 00	176	27.6	S13	31.3	279	38.2	11.5	S17	19.9	12.2	57.2	S 50	03 41	04 27	05 02	21 53	22 16	22 47
01		191	27.6		30.4	294	08.7	11.2	17	32.1	12.2	57.2	52	03 31	04 19	04 57	21 47	22 07	22 36	23 18
02		206	27.7		29.6	308	38.9	11.2	17	44.3	12.0	57.3	54	03 19	04 11	04 51	21 39	21 56	22 22	23 02
03		221	27.7		28.8	323	09.1	11.1	17	56.3	12.0	57.3	56	03 04	04 01	04 44	21 31	21 45	22 07	22 44
04		236	27.7		27.9	337	39.2	11.0	18	08.3	12.0	57.3	58	02 46	03 51	04 37	21 22	21 32	21 48	22 20
05		251	27.7		27.1	352	09.2	10.8	18	20.3	11.8	57.4	S 60	02 24	03 38	04 29	21 12	21 16	21 26	21 50
06		266	27.7	S13	26.3	6	39.0	10.8	S18	32.1	11.8	57.4	Lat.	Sunset	Twilight		Moonset			
07		281	27.7		25.4	21	08.8	10.6	18	43.9	11.7	57.4			Civil	Naut.	12	13	14	15
08		296	27.7		24.6	35	38.4	10.5	18	55.6	11.6	57.5	N 72	h m	h m	h m	h m	h m	h m	h m
09		311	27.7		23.7	50	07.9	10.5	19	07.2	11.5	57.5		15 23	16 45	18 06	07 31	08 53	10 14	11 35
10		326	27.8		22.9	64	37.4	10.2	19	18.7	11.4	57.5	N 70	15 45	16 56	18 09	07 57	09 18	10 39	11 59
11		341	27.8		22.1	79	06.6	10.2	19	30.1	11.4	57.6	68	16 02	17 05	18 11	08 17	09 43	11 04	12 25
12		356	27.8	S13	21.2	93	35.8	10.1	S19	41.5	11.2	57.6	66	16 16	17 12	18 13	08 34	09 54	11 14	12 35
13		11	27.8		20.4	108	04.9	9.9	19	52.7	11.2	57.6	64	16 27	17 19	18 15	08 47	09 37	10 21	11 42
14		26	27.8		19.5	122	33.8	9.8	20	03.9	11.1	57.7	62	16 37	17 24	18 17	08 58	09 55	10 52	12 13
15		41	27.8		18.7	137	02.6	9.7	20	15.0	10.9	57.7	60	16 45	17 29	18 18	09 08	09 10	09 16	09 30
16		56	27.8		17.8	151	31.3	9.6	20	25.9	10.9	57.7	N 58	16 52	17 34	18 20	09 17	09 24	09 35	09 57
17		71	27.9		17.0	165	59.9	9.5	20	36.8	10.8	57.8	56	16 59	17 38	18 22	09 24	09 35	09 51	10 19
18		86	27.9	S13	16.2	180	28.4	9.3	S20	47.6	10.7	57.8	54	17 04	17 41	18 23	09 31	09 45	10 05	10 37
19		101	27.9		15.3	194	56.7	9.2	20	58.3	10.6	57.8	52	17 10	17 45	18 25	09 37	09 54	10 17	10 52
20		116	27.9		14.5	209	24.9	9.1	21	08.9	10.5	57.9	50	17 14	17 48	18 26	09 42	10 02	10 28	11 05
21		131	27.9		13.6	223	53.0	9.0	21	19.4	10.3	57.9	45	17 25	17 55	18 29	09 54	10 19	10 50	11 32
22		146	27.9		12.8	238	21.0	8.8	21	29.7	10.3	57.9	N 40	17 33	18 01	18 33	10 04	10 33	11 09	11 54
23		161	28.0		11.9	252	48.8	8.8	21	40.0	10.2	58.0	35	17 40	18 06	18 36	10 13	10 45	11 24	12 12
TUESDAY		14 00	176	28.0	S13	11.1	267	16.6	8.6	S21	50.2	10.0	58.0	30	17 47	18 11	18 40	10 20	10 56	11 37
	01	191	28.0		10.2	281	44.2	8.4	22	00.2	10.0	58.0	20	17 58	18 21	18 47	10 33	11 14	12 00	12 53
	02	206	28.0		09.4	296	11.6	8.4	22	10.2	9.8	58.1	N 10	18 08	18 30	18 55	10 45	11 30	12 20	13 16
	03	221	28.0		08.6	310	39.0	8.2	22	20.0	9.7	58.1	0	18 18	18 39	19 03	10 56	11 45	12 38	13 37
	04	236	28.1		07.7	325	06.2	8.1	22	29.7	9.6	58.1	S 10	18 27	18 49	19 14	11 07	11 59	12 57	13 58
	05	251	28.1		06.9	339	33.3	8.0	22	39.3	9.5	58.2	20	18 37	19 00	19 27	11 18	12 16	13 17	14 21
	06	266	28.1	S13	06.0	354	00.3	7.8	S22	48.8	9.3	58.2	30	18 49	19 14	19 44	11 32	12 34	13 40	14 47
	07	281	28.1		05.2	8	27.1	7.8	22	58.1	9.3	58.2	35	18 56	19 23	19 55	11 39	12 45	13 53	15 03
	08	296	28.1		04.3	22	53.9	7.6	23	07.4	9.1	58.3	40	19 04	19 33	20 08	11 48	12 57	14 09	15 21
	09	311	28.2		03.5	37	20.5	7.4	23	16.5	9.0	58.3	45	19 14	19 45	20 24	11 59	13 12	14 28	15 43
	10	326	28.2		02.6	51	46.9	7.4	23	25.5	8.8	58.4	S 50	19 25	20 00	20 45	12 11	13 30	14 52	16 11
	11	341	28.2		01.8	66	13.3	7.2	23	34.3	8.8	58.4	52	19 30	20 08	20 56	12 17	13 39	15 03	16 25
	12	356	28.2	S13	00.9	80	39.5	7.1	S23	43.1	8.6	58.4	54	19 36	20 16	21 08	12 24	13 49	15 16	16 40
	13	11	28.2	13	00.1	95	05.6	7.0	23	51.7	8.4	58.5	56	19 42	20 25	21 22	12 31	14 00	15 31	

UT	ARIES			VENUS −3.9			MARS +0.1			JUPITER −2.1			SATURN +0.7			STARS											
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec											
WEDNESDAY	144 44.6	150 18.0 S 3	42.5	72 22.9 N25	02.0	136 10.6 N 2	27.3	174 34.4 S13	30.6	Acamar	315 13.0 S40	13.0	Achernar	335 21.6 S57	07.5	Achuz	173 01.3 S63	13.4	Adhara	255 06.8 S29	00.4	Aldebaran	290 41.3 N16	33.3			
	234 59.4	240 16.0 S 3	34.8	162 32.3 N25	02.4	226 22.5 N 2	28.6	264 47.5 S13	30.0	Alioth	166 14.0 N55	49.8	Alkaid	152 53.0 N49	11.6	Alnair	27 35.3 S46	51.1	Alnilam	275 39.2 S 1	11.1	Alphard	217 49.0 S 8	45.6			
	265 04.3	270 15.3	32.2	192 35.5	02.5	256 26.5	29.0	294 51.6	29.8	Alpheratz	357 36.7 N29	13.0	Altair	62 01.8 N 8	55.6	Ankaa	353 09.0 S42	11.1	Antares	112 17.8 S26	28.9						
	325 14.2	330 13.9 S 3	27.0	252 41.8 N25	02.8	316 34.4 N 2	29.8	355 00.5 S13	29.4	Arcturus	145 49.2 N19	03.5	Atria	107 13.7 S69	03.9	Avior	234 14.8 S59	35.1	Bellatrix	278 24.4 N 6	22.2	Betelgeuse	270 53.6 N 7	24.6			
	340 16.6	345 13.6	25.7	267 43.4	02.9	331 36.4	30.1	10 02.7	29.3	Canopus	263 52.7 S52	42.7	Capella	280 24.0 N46	04.1	Deneb	49 27.3 N45	21.6	Denebola	182 26.3 N14	26.5	Diphda	348 49.1 S17	51.8			
	355 19.1	0 13.2	24.4	282 45.0	03.0	346 38.4	30.3	25 04.8	29.2	Dubhe	193 42.3 N61	37.5	Elath	278 03.7 N28	37.7	Eltanin	90 43.2 N51	28.8	Enif	33 40.2 N 9	58.7	Fomalhaut	15 16.6 S29	30.2			
	10 21.5	15 12.9	23.1	297 46.5	03.0	1 40.4	30.5	40 07.0	29.1	Gacrux	171 53.0 S57	14.4	Gienah	175 44.9 S17	40.2	Hadar	148 38.0 S60	28.8	Hamal	327 53.1 N23	34.3	Kaus Aust.	83 34.8 S34	22.4			
	25 24.0	30 12.6	21.8	312 48.1	03.1	16 42.4	30.7	55 09.2	29.0	Elanah	207 35.8 N11	51.2	Rigel	281 05.2 S 8	10.6	Rigel Kent.	139 42.3 S60	55.6	Sabik	102 04.7 S15	45.2						
	40 26.5	45 12.2	20.5	327 49.7	03.2	31 44.4	30.9	70 11.4	28.9	Schedar	349 33.2 N56	39.9	Shaula	96 12.7 S37	07.1	Sirius	258 27.4 S16	45.0	Spica	158 23.8 S11	16.9	Suhail	222 47.0 S43	31.6			
	55 28.9	60 11.9 S 3	19.2	342 51.2 N25	03.2	46 46.3 N 2	31.1	85 13.5 S13	28.8	Vega	80 34.6 N38	48.0	Zuben'ubi	136 57.7 S16	08.3	Venus	4 26.1 14 00		Mars	287 16.9 19 06		Jupiter	351 14.5 14 50		Saturn	29 42.8 12 16	
	70 31.4	75 11.5	17.9	357 52.8	03.3	61 48.3	31.3	100 15.7	28.7																		
	85 33.9	90 11.2	16.6	12 54.4	03.4	76 50.3	31.5	115 17.9	28.6																		
	100 36.3	105 10.9	15.4	27 56.0	03.4	91 52.3	31.7	130 20.0	28.5																		
	115 38.8	120 10.5	14.1	42 57.5	03.5	106 54.3	32.0	145 22.2	28.4																		
	130 41.3	135 10.2	12.8	57 59.1	03.6	121 56.3	32.2	160 24.4	28.3																		
	145 43.7	150 09.8 S 3	11.5	73 00.7 N25	03.6	136 58.3 N 2	32.4	175 26.6 S13	28.2																		
	160 46.2	165 09.5	10.2	88 02.2	03.7	152 00.2	32.6	190 28.7	28.1																		
	175 48.7	180 09.2	08.9	103 03.8	03.8	167 02.2	32.8	205 30.9	28.0																		
	190 51.1	195 08.8	07.6	118 05.4	03.9	182 04.2	33.0	220 33.1	27.9																		
	205 53.6	210 08.5	06.3	133 06.9	03.9	197 06.2	33.2	235 35.2	27.7																		
	220 56.0	225 08.1	05.0	148 08.5	04.0	212 08.2	33.4	250 37.4	27.6																		
	235 58.5	240 07.8 S 3	03.7	163 10.0 N25	04.1	227 10.2 N 2	33.7	265 39.6 S13	27.5																		
	251 01.0	255 07.5	02.4	178 11.6	04.1	242 12.1	33.9	280 41.8	27.4																		
	266 03.4	270 07.1	01.1	193 13.2	04.2	257 14.1	34.1	295 43.9	27.3																		
281 05.9	285 06.8	00.2	208 14.7	04.3	272 16.1	34.3	310 46.1	27.2																			
296 08.4	300 06.4	58.5	223 16.3	04.3	287 18.1	34.5	325 48.3	27.1																			
311 10.8	315 06.1	57.2	238 17.8	04.4	302 20.1	34.7	340 50.4	27.0																			
326 13.3	330 05.8 S 2	55.9	253 19.4 N25	04.5	317 22.0 N 2	34.9	355 52.6 S13	26.9																			
341 15.8	345 05.4	54.6	268 21.0	04.5	332 24.0	35.1	10 54.8	26.8																			
356 18.2	0 05.1	53.3	283 22.5	04.6	347 26.0	35.3	25 57.0	26.7																			
11 20.7	15 04.8	52.0	298 24.1	04.7	2 28.0	35.6	40 59.1	26.6																			
26 23.2	30 04.4	50.7	313 25.6	04.7	17 30.0	35.8	56 01.3	26.5																			
41 25.6	45 04.1	49.4	328 27.2	04.8	32 32.0	36.0	71 03.5	26.4																			
56 28.1	60 03.7 S 2	48.1	343 28.7 N25	04.9	47 33.9 N 2	36.2	86 05.6 S13	26.3																			
71 30.5	75 03.4	46.8	358 30.3	05.0	62 35.9	36.4	101 07.8	26.2																			
86 33.0	90 03.1	45.5	13 31.8	05.0	77 37.9	36.6	116 10.0	26.1																			
101 35.5	105 02.7	44.2	28 33.4	05.1	92 39.9	36.8	131 12.2	26.0																			
116 37.9	120 02.4	42.9	43 34.9	05.2	107 41.9	37.0	146 14.3	25.9																			
131 40.4	135 02.1	41.6	58 36.5	05.2	122 43.8	37.3	161 16.5	25.8																			
146 42.9	150 01.7 S 2	40.3	73 38.0 N25	05.3	137 45.8 N 2	37.5	176 18.7 S13	25.7																			
161 45.3	165 01.4	39.0	88 39.6	05.4	152 47.8	37.7	191 20.8	25.6																			
176 47.8	180 01.1	37.7	103 41.1	05.4	167 49.8	37.9	206 23.0	25.5																			
191 50.3	195 00.7	36.4	118 42.7	05.5	182 51.8	38.1	221 25.2	25.4																			
206 52.7	210 00.4	35.1	133 44.2	05.6	197 53.7	38.3	236 27.4	25.3																			
221 55.2	225 00.1	33.8	148 45.8	05.6	212 55.7	38.5	251 29.5	25.2																			
236 57.7	239 59.7 S 2	32.5	163 47.3 N25	05.7	227 57.7 N 2	38.7	266 31.7 S13	25.1																			
252 00.1	254 59.4	31.2	178 48.9	05.8	242 59.7	39.0	281 33.9	25.0																			
267 02.6	269 59.1	29.9	193 50.4	05.8	258 01.7	39.2	296 36.0	24.9																			
282 05.0	284 58.7	28.6	208 51.9	05.9	273 03.6	39.4	311 38.2	24.8																			
297 07.5	299 58.4	27.3	223 53.5	06.0	288 05.6	39.6	326 40.4	24.7																			
312 10.0	314 58.1	26.0	238 55.0	06.1	303 07.6	39.8	341 42.6	24.6																			
327 12.4	329 57.7 S 2	24.7	253 56.6 N25	06.1	318 09.6 N 2	40.0	356 44.7 S13	24.5																			
342 14.9	344 57.4	23.4	268 58.1	06.2	333 11.6	40.2	11 46.9	24.4																			
357 17.4	359 57.1	22.1	283 59.6	06.3	348 13.5	40.5	26 49.1	24.3																			
12 19.8	14 56.7	20.8	299 01.2	06.3	3 15.5	40.7	41 51.3	24.2																			
27 22.3	29 56.4	19.5	314 02.7	06.4	18 17.5	40.9	56 53.4	24.1																			
42 24.8	44 56.1	18.2	329 04.2	06.5	33 19.5	41.1	71 55.6	24.0																			
57 27.2	59 55.7 S 2	16.9	344 05.8 N25	06.5	48 21.5 N 2	41.3	86 57.8 S13	23.9																			
72 29.7	74 55.4	15.6	359 07.3	06.6	63 23.4	41.5	101 59.9	23.8																			
87 32.2	89 55.1	14.3	14 08.9	06.78																							

UT	SUN		MOON					Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	v	Dec	d	HP		Naut.	Civil		15	16	17	18
												h m	h m	h m	h m
WEDNESDAY	d h	° ' °													

UT	ARIES	VENUS	-3.9	MARS	+0.2	JUPITER	-2.1	SATURN	+0.7	STARS			
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
SATURDAY	1800	147 42.0	149 53.7 S 2 09.1	74 15.0 N25 06.9	138 33.3 N 2 42.6	177 10.8 S13 23.2	Acamar	315 13.0 S40 13.0					
	01	162 44.5	164 53.4 07.8	89 16.5 07.0	153 35.3 42.8	192 13.0 23.1	Achernar	335 21.7 S57 07.5					
	02	177 46.9	179 53.1 06.5	104 18.0 07.1	168 37.3 43.0	207 15.1 23.0	Acruz	173 01.2 S63 13.5					
	03	192 49.4	194 52.7 05.2	119 19.6 07.1	183 39.3 43.2	222 17.3 22.9	Adhara	255 06.8 S29 00.4					
	04	207 51.9	209 52.4 03.9	134 21.1 07.2	198 41.2 43.4	237 19.5 22.8	Aldebaran	290 41.3 N16 33.3					
	05	222 54.3	224 52.1 02.6	149 22.6 07.3	213 43.2 43.7	252 21.7 22.7							
	06	237 56.8	239 51.8 S 2 01.3	164 24.2 N25 07.4	228 45.2 N 2 43.9	267 23.8 S13 22.6	Alioth	166 13.9 N55 49.8					
	07	252 59.3	254 51.4 2 00.0	179 25.7 07.4	243 47.2 44.1	282 26.0 22.5	Alkaid	152 53.0 N49 11.6					
	08	268 01.7	269 51.1 1 58.7	194 27.2 07.5	258 49.1 44.3	297 28.2 22.4	Alnair	27 35.3 S46 51.1					
	09	283 04.2	284 50.8 1 57.4	209 28.7 07.6	273 51.1 44.5	312 30.3 22.3	Anilam	275 39.2 S 1 11.3					
	10	298 06.7	299 50.4 56.1	224 30.3 07.6	288 53.1 44.7	327 32.5 22.2	Alphard	217 49.0 S 8 45.6					
	11	313 09.1	314 50.1 54.8	239 31.8 07.7	303 55.1 44.9	342 34.7 22.1							
	12	328 11.6	329 49.8 S 1 53.5	254 33.3 N25 07.8	318 57.1 N 2 45.2	357 36.9 S13 22.0	Alphecca	126 05.0 N26 38.0					
	13	343 14.0	344 49.4 52.2	269 34.8 07.8	333 59.0 45.4	12 39.0 21.9	Alpheratz	357 36.7 N29 13.0					
	14	358 16.5	359 49.1 50.9	284 36.3 07.9	349 01.0 45.6	27 41.2 21.8	Altair	62 01.7 N 8 55.6					
	15	13 19.0	14 48.8 49.6	299 37.9 08.0	4 03.0 45.8	42 43.4 21.7	Ankaa	353 09.0 S42 11.1					
	16	28 21.4	29 48.5 48.3	314 39.4 08.0	19 05.0 46.0	57 45.5 21.6	Antares	112 17.8 S26 28.9					
	17	43 23.9	44 48.1 47.0	329 40.9 08.1	34 06.9 46.2	72 47.7 21.5							
	18	58 26.4	59 47.8 S 1 45.7	344 42.4 N25 08.2	49 08.9 N 2 46.4	87 49.9 S13 21.4	Arcturus	145 49.2 N19 03.5					
	19	73 28.8	74 47.5 44.4	359 43.9 08.2	64 10.9 46.7	102 52.1 21.3	Atria	107 13.6 S69 03.9					
	20	88 31.3	89 47.1 43.1	14 45.5 08.3	79 12.9 46.9	117 54.2 21.2	Avior	234 14.8 S59 35.1					
	21	103 33.8	104 46.8 41.8	29 47.0 08.4	94 14.8 47.1	132 56.4 21.1	Bellatrix	278 24.4 N 6 22.2					
	22	118 36.2	119 46.5 40.5	44 48.5 08.4	109 16.8 47.3	147 58.6 21.0	Betelgeuse	270 53.6 N 7 24.6					
	23	133 38.7	134 46.2 39.2	59 50.0 08.5	124 18.8 47.5	163 00.7 20.9							
SUNDAY	1900	148 41.1	149 45.8 S 1 37.9	74 51.5 N25 08.6	139 20.8 N 2 47.7	178 02.9 S13 20.8	Canopus	263 52.8 S52 42.7					
	01	163 43.6	164 45.5 36.6	89 53.0 08.6	154 22.7 47.9	193 05.1 20.7	Capella	280 24.0 N46 01.4					
	02	178 46.1	179 45.2 35.3	104 54.5 08.7	169 24.7 48.2	208 07.3 20.6	Deneb	49 27.3 N45 21.5					
	03	193 48.5	194 44.9 34.0	119 56.1 08.8	184 26.7 48.4	223 09.4 20.5	Denebola	182 26.4 N 6 24.6					
	04	208 51.0	209 44.5 32.7	134 57.6 08.9	199 28.7 48.6	238 11.6 20.4	Diphda	348 49.1 S17 51.8					
	05	223 53.5	224 44.2 31.3	149 59.1 08.9	214 30.6 48.8	253 13.8 20.3							
	06	238 55.9	239 43.9 S 1 30.0	165 00.6 N25 09.0	229 32.6 N 2 49.0	268 15.9 S13 20.2	Dubhe	193 42.2 N61 37.5					
	07	253 58.4	254 43.6 28.7	180 02.1 09.1	244 34.6 49.2	283 18.1 20.1	Elnath	278 03.7 N28 37.6					
	08	269 00.9	269 43.2 27.4	195 03.6 09.1	259 36.6 49.4	298 20.3 20.0	Eltanin	90 43.2 N51 28.8					
	09	284 03.3	284 42.9 26.1	210 05.1 09.2	274 38.5 49.7	313 22.5 19.9	Enif	33 40.6 N 9 58.7					
	10	299 05.8	299 42.6 24.8	225 06.6 09.3	289 40.5 49.9	328 24.6 19.8	Fomalhaut	15 16.6 S29 30.2					
	11	314 08.3	314 42.2 23.5	240 08.1 09.3	304 42.5 50.1	343 26.8 19.7							
	12	329 10.7	329 41.9 S 1 22.2	255 09.6 N25 09.4	319 44.5 N 2 50.3	358 29.0 S13 19.6	Gacrux	171 52.9 S57 14.4					
	13	344 13.2	344 41.6 20.9	270 11.1 09.5	334 46.4 50.5	13 31.1 19.5	Gienah	175 44.9 S17 40.2					
	14	359 15.6	359 41.3 19.6	285 12.7 09.5	349 48.4 50.7	28 33.3 19.4	Hadar	148 37.9 S60 28.8					
	15	14 18.1	14 40.9 18.3	300 14.2 09.6	4 50.4 51.0	43 35.5 19.3	Hamal	327 53.1 N23 34.3					
	16	29 20.6	29 40.6 17.0	315 15.7 09.7	19 52.3 51.2	58 37.7 19.2	Kaus Aust.	83 34.8 S34 22.4					
	17	44 23.0	44 40.3 15.7	330 17.2 09.7	34 54.3 51.4	73 39.8 19.1							
	18	59 25.5	59 40.0 S 1 14.4	345 18.7 N25 09.8	49 56.3 N 2 51.6	88 42.0 S13 18.9	Kochab	137 19.4 N74 03.3					
	19	74 28.0	74 39.6 13.1	0 20.2 09.9	64 58.3 51.8	103 44.2 18.8	Markab	13 31.8 N15 19.6					
	20	89 30.4	89 39.3 11.8	15 21.7 09.9	80 00.2 52.0	118 46.3 18.7	Menkar	314 07.8 N 4 10.7					
	21	104 32.9	104 39.0 10.5	30 23.2 10.0	95 02.2 52.2	133 48.5 18.6	Menkent	147 59.3 S36 28.9					
	22	119 35.4	119 38.7 09.2	45 24.7 10.1	110 04.2 52.5	148 50.7 18.5	Miaplacidus	221 37.7 S69 48.7					
	23	134 37.8	134 38.4 07.9	60 26.2 10.1	125 06.2 52.7	163 52.9 18.4							
MONDAY	2000	149 40.3	149 38.0 S 1 06.6	75 27.7 N25 10.2	140 08.1 N 2 52.9	178 55.0 S13 18.3	Mirfak	308 30.5 N49 56.7					
	01	164 42.8	164 37.7 05.2	90 29.2 10.3	155 10.1 53.1	193 57.2 18.2	Nunki	75 49.9 S26 16.1					
	02	179 45.2	179 37.4 03.9	105 30.7 10.3	170 12.1 53.3	208 59.4 18.1	Peacock	53 08.7 S56 39.6					
	03	194 47.7	194 37.1 02.6	120 32.1 10.4	185 14.0 53.5	224 01.5 18.0	Pollux	243 18.9 N27 58.2					
	04	209 50.1	209 36.7 01.3	135 33.6 10.5	200 16.0 53.8	239 03.7 17.9	Procyon	244 52.2 N 5 09.9					
	05	224 52.6	224 36.4 1 00.0	150 35.1 10.5	215 18.0 54.0	254 05.9 17.8							
	06	239 55.1	239 36.1 S 0 58.7	165 36.6 N25 10.6	230 20.0 N 2 54.2	269 08.1 S13 17.7	Rasalhague	96 00.1 N12 32.4					
	07	254 57.5	254 35.8 57.4	180 38.1 10.7	245 21.9 54.4	284 10.2 17.6	Regulus	207 35.8 N11 51.2					
	08	270 00.0	269 35.4 56.1	195 39.6 10.7	260 23.9 54.6	299 12.4 17.5	Rigel	281 05.2 S 8 10.6					
	09	285 02.5	284 35.1 54.8	210 41.1 10.8	275 25.9 54.8	314 14.6 17.4	Rigil Kent.	139 42.2 S60 55.6					
	10	300 04.9	299 34.8 53.5	225 42.6 10.9	290 27.8 55.1	329 16.8 17.3	Sabik	102 04.7 S15 45.2					
	11	315 07.4	314 34.5 52.2	240 44.1 10.9	305 29.8 55.3	344 18.9 17.2							
	12	330 09.9	329 34.1 S 0 50.9	255 45.6 N25 11.0	320 31.8 N 2 55.5	359 21.1 S13 17.1	Schedar	349 33.2 N56 39.9					
	13	345 12.3	344 33.8 49.6	270 47.1 11.1	335 33.8 55.7	14 23.3 17.0	Shaula	96 12.6 S37 07.1					
	14	0 14.8	359 33.5 48.3	285 48.6 11.1	350 35.7 55.9	29 25.4 16.9	Sirius	258 27.4 S16 45.0					
	15	15 17.2	14 33.2 47.0	300 50.0 11.2	5 37.7 56.1	44 27.6 16.8	Spica	158 23.7 S11 16.9					
	16	30 19.7	29 32.9 45.7	315 51.5 11.3	20 39.7 56.3	59 29.8 16.7	Suhail	222 47.0 S43 31.6					
	17	45 22.2	44 32.5 44.3	330 53.0 11.3	35 41.6 56.6	74 32.0 16.6							
	18	60 24.6	59 32.2 S 0 43.0	345 54.5 N25 11.4	50 43.6 N 2 56.8	89 34.1 S13 16.5	Vega	80 34.5 N38 48.0					
	19	75 27.1	74 31.9 41.7	0 56.0 11.5	65 45.6 57.0	104 36.3 16.4	Zuben'ubi	136 57.6 S16 08.3					
	20	90 29.6	89 31.6 40.4	15 57.5 11.5	80 47.5 57.2	119 38.5 16.3							
	21	105 32.0	104 31.3 39.1	30 59.0 11.6	95 49.5 57.4	134 40.6 16.2							
	22	120 34.5	119 30.9 37.8	46 00.4 11.7	110 51.5 57.6	149 42.8 16.1							
	23	135 37.0	134 30.6 36.5	61 01.9 11.7	125 53.5 57.9	164 45.0 16.0							
Mer.Pass. 14 02.9													
v -0.3 d 1.3													
v 1.5 d 0.1													
v 2.0 d 0.2													
v 2.2 d 0.1													
											SHA	Mer.Pass.	
											h m	h m	
											14 01	14 01	
											Venus	1 04.7	
											Mars	286 10.4	
											Jupiter	350 39.6	
											Saturn	29 21.8	

UT	SUN			MOON						Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec		GHA	ν	Dec	d	HP	Naut.		Civil	18		19	20	21	
d h	° ' "	° ' "	° ' "	° ' "		° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m
18 00	176 31.1	S11 48.2		208 08.6	2.5	S25 43.3	7.0	60.9	N 72	05 58	07 17	08 32			10 02	09 06	
	191 31.2		47.4	222 30.1	2.6	25 36.3	7.1	60.9	N 70	05 58	07 09	08 16		11 28	09 32	08 54	
	206 31.2		46.5	236 51.7	2.6	25 29.2	7.3	60.9	68	05 58	07 03	08 02		09 57	09 10	08 44	
	221 31.3		45.6	251 13.3	2.7	25 21.9	7.5	61.0	66	05 58	06 57	07 52		09 18	08 52	08 36	
	236 31.3		44.7	265 35.0	2.8	25 14.4	7.7	61.0	64	05 57	06 53	07 42	09 13	08 50	08 38	08 28	
	251 31.4		43.8	279 56.8	2.8	25 06.7	7.8	61.0	62	05 57	06 48	07 35	08 31	08 28	08 25	08 22	
18 06	266 31.4	S11 43.0		294 18.6	2.9	S24 58.9	8.1	61.0	60	05 56	06 45	07 28	08 02	08 11	08 15	08 17	
	281 31.5		42.1	308 40.5	3.0	24 50.8	8.3	61.0	N 58	05 56	06 41	07 22	07 39	07 56	08 06	08 12	
	296 31.5		41.2	323 02.5	3.0	24 42.5	8.4	61.0	56	05 55	06 38	07 17	07 21	07 43	07 58	08 08	
	311 31.6		40.3	337 24.5	3.1	24 34.1	8.6	61.0	54	05 55	06 36	07 12	07 05	07 32	07 50	08 04	
	326 31.6		39.4	351 46.6	3.2	24 25.5	8.8	61.1	52	05 54	06 33	07 08	06 52	07 22	07 44	08 00	
	341 31.7		38.5	6 08.8	3.3	24 16.7	9.0	61.1	50	05 53	06 31	07 04	06 40	07 14	07 38	07 57	
18 12	356 31.7	S11 37.7		20 31.1	3.3	S24 07.7	9.2	61.1	45	05 51	06 25	06 55	06 16	06 55	07 25	07 50	
	11 31.8		36.8	34 53.4	3.4	23 58.5	9.3	61.1	N 40	05 49	06 21	06 48	05 56	06 39	07 14	07 44	
	26 31.8		35.9	49 15.8	3.5	23 49.2	9.6	61.1	35	05 47	06 16	06 42	05 39	06 26	07 05	07 39	
	41 31.9		35.0	63 38.3	3.6	23 39.6	9.7	61.1	30	05 44	06 12	06 36	05 25	06 15	06 57	07 34	
	56 31.9		34.1	78 00.9	3.6	23 29.9	9.8	61.1	20	05 39	06 05	06 27	05 00	05 55	06 43	07 27	
	71 32.0		33.2	92 23.5	3.8	23 20.1	10.1	61.1	N 10	05 32	05 57	06 18	04 39	05 38	06 31	07 20	
18 18	86 32.1	S11 32.4		106 46.3	3.8	S23 10.0	10.2	61.1	0	05 25	05 49	06 10	04 19	05 21	06 19	07 13	
	101 32.1		31.5	121 09.1	4.0	22 59.8	10.3	61.1	S 10	05 16	05 41	06 02	03 59	05 05	06 08	07 07	
	116 32.2		30.6	135 32.1	4.0	22 49.5	10.6	61.2	20	05 04	05 31	05 53	03 38	04 48	05 55	07 00	
	131 32.2		29.7	149 55.1	4.1	22 38.9	10.7	61.2	30	04 49	05 18	05 43	03 13	04 28	05 41	06 52	
	146 32.3		28.8	164 18.2	4.2	22 28.2	10.9	61.2	35	04 40	05 11	05 37	02 58	04 16	05 33	06 47	
	161 32.3		27.9	178 41.4	4.3	22 17.3	11.0	61.2	40	04 28	05 02	05 30	02 41	04 02	05 23	06 42	
19 00	176 32.4	S11 27.0		193 04.7	4.3	S22 06.3	11.2	61.2	45	04 13	04 51	05 22	02 21	03 46	05 12	06 36	
	191 32.4		26.1	207 28.0	4.5	21 55.1	11.3	61.2	S 50	03 55	04 38	05 13	01 55	03 26	04 58	06 28	
	206 32.5		25.3	221 51.5	4.6	21 43.8	11.5	61.2	52	03 46	04 32	05 08	01 43	03 16	04 52	06 25	
	221 32.5		24.4	236 15.1	4.7	21 32.3	11.7	61.2	54	03 35	04 25	05 03	01 28	03 05	04 45	06 21	
	236 32.6		23.5	250 38.8	4.8	21 20.6	11.8	61.2	56	03 23	04 17	04 58	01 12	02 53	04 37	06 17	
	251 32.6		22.6	265 02.6	4.8	21 08.8	11.9	61.2	58	03 09	04 08	04 52	00 51	02 39	04 28	06 12	
19 06	266 32.7	S11 21.7		279 26.4	5.0	S20 56.9	12.1	61.2	S 60	02 51	03 57	04 45	00 26	02 22	04 17	06 07	
	281 32.8		20.8	293 50.4	5.1	20 44.8	12.2	61.2		Lat.	Sunset	Twilight		Moonset			
	296 32.8		19.9	308 14.5	5.1	20 32.6	12.4	61.2				Civil	Naut.	18	19	20	21
	311 32.9		19.0	322 38.6	5.3	20 20.2	12.5	61.2						h m	h m	h m	h m
	326 32.9		18.1	337 02.9	5.4	20 07.7	12.7	61.2	N 72	15 57	17 12	18 32			15 33	18 20	
	341 33.0		17.3	351 27.3	5.5	19 55.0	12.8	61.2	N 70	16 13	17 20	18 31		12 05	16 00	18 29	
19 12	356 33.0	S11 16.4		5 51.8	5.6	S19 42.2	12.9	61.2	68	16 27	17 26	18 31		13 34	16 21	18 37	
	11 33.1		15.5	20 16.4	5.6	19 29.3	13.0	61.2	66	16 37	17 32	18 32		14 13	16 36	18 43	
	26 33.2		14.6	34 41.0	5.8	19 16.3	13.2	61.2	64	16 46	17 36	18 32	12 08	14 39	16 49	18 48	
	41 33.2		13.7	49 05.8	5.9	19 03.1	13.3	61.2	62	16 54	17 40	18 32	12 50	14 59	17 00	18 52	
	56 33.3		12.8	63 30.7	6.0	18 49.8	13.4	61.2	60	17 01	17 44	18 33	13 18	15 16	17 09	18 56	
	71 33.3		11.9	77 55.7	6.1	18 36.4	13.6	61.2	N 58	17 07	17 47	18 33	13 40	15 30	17 17	18 59	
19 18	86 33.4	S11 11.0		92 20.8	6.2	S18 22.8	13.7	61.2	56	17 12	17 50	18 34	13 57	15 42	17 24	19 02	
	101 33.5		10.1	106 46.0	6.3	18 09.1	13.8	61.2	54	17 17	17 53	18 34	14 12	15 52	17 31	19 05	
	116 33.5		09.2	121 11.3	6.4	17 55.3	13.9	61.2	52	17 21	17 55	18 35	14 25	16 01	17 36	19 07	
	131 33.6		08.3	135 36.7	6.6	17 41.4	14.0	61.2	50	17 25	17 58	18 35	14 37	16 09	17 41	19 09	
	146 33.6		07.4	150 02.3	6.6	17 27.4	14.1	61.2	45	17 33	18 03	18 37	15 00	16 27	17 52	19 14	
	161 33.7		06.5	164 27.9	6.7	17 13.3	14.2	61.2	N 40	17 40	18 08	18 39	15 19	16 41	18 01	19 18	
20 00	176 33.8	S11 05.7		178 53.6	6.8	S16 59.1	14.4	61.1	35	17 46	18 12	18 41	15 35	16 52	18 08	19 21	
	191 33.8		04.8	193 19.4	6.9	16 44.7	14.4	61.1	30	17 51	18 16	18 44	15 48	17 03	18 15	19 24	
	206 33.9		03.9	207 45.3	7.1	16 30.3	14.6	61.1	20	18 01	18 23	18 49	16 11	17 20	18 26	19 29	
	221 33.9		03.0	222 11.4	7.1	16 15.7	14.6	61.1	N 10	18 09	18 31	18 55	16 31	17 35	18 36	19 33	
	236 34.0		02.1	236 37.5	7.2	16 01.1	14.8	61.1	0	18 17	18 38	19 03	16 49	17 49	18 45	19 37	
	251 34.1		01.2	251 03.7	7.4	15 46.3	14.8	61.1	S 10	18 25	18 47	19 12	17 07	18 03	18 54	19 41	
20 06	266 34.1	S11 00.3		265 30.1	7.4	S15 31.5	14.9	61.1	20	18 34	18 56	19 23	17 27	18 18	19 04	19 45	
	281 34.2	10 59.4		279 56.5	7.5	15 16.6	15.1	61.1	30	18 44	19 09	19 38	17 49	18 35	19 15	19 50	
	296 34.3		58.5	294 23.0	7.7	15 01.5	15.1	61.1	35	18 50	19 16	19 47	18 02	18 45	19 21	19 53	
	311 34.3		57.6	308 49.7	7.7	14 46.4	15.2	61.0	40	18 56	19 25	19 59	18 17	18 56	19 28	19 56	
	326 34.4		56.7	323 16.4	7.8	14 31.2	15.2	61.0	45	19 04	19 35	20 13	18 34	19 09	19 36	19 59	
	341 34.5		55.8	337 43.2	8.0	14 16.0	15.4	61.0	S 50	19 14	19 48	20 31	18 55	19 24	19 46	20 03	
20 12	356 34.5	S10 54.9		352 10.2	8.0	S14 00.6	15.4	61.0	52	19 18	19 54	20 40	19 06	19 31	19 50	20 05	
	11 34.6		54.0	6 37.2	8.1	13 45.2	15.6	61.0	54	19 23	20 01	20 50	19 17	19 39	19 55	20 07	
	26 34.7		53.1	21 04.3	8.2	13 29.6	15.5	61.0	56	19 28	20 09	21 02	19 30	19 48	20 00	20 09	
	41 34.7		52.2	35 31.5	8.4	13 14.1	15.7	61.0	58	19 34	20 18	21 16	19 45	19 58	20 06	20 12	
	56 34.8		51.3	49 58.9	8.4	12 58.4	15.7	60.9	S 60	19 41	20 28	21 33	20 03	20 10	20 13	20 15	
	71 34.8		50.4	64 26.3	8.5	12 42.7	15.8	60.9		SUN		MOON					
20 18	86 34.9	S10 49.5		78 53.8	8.6	S12 26.9	15.9	60.9	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
	101 35.0		48.6	93 21.4	8.6	12 11.0	15.9	60.9		00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
	116 35.0		47.7	107 49.0	8.8	11 55.1	16.0	60.9	18	13 55	13 53	12 14	10 34	23 05	28	5	
	18																

UT	ARIES		VENUS −3.9		MARS +0.3		JUPITER −2.1		SATURN +0.8		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
TUESDAY	00	150 39.4	149 30.3 S 0	35.2	76 03.4 N25	11.8	140 55.4 N 2	58.1	179 47.2 S13	15.9	Acamar	315 13.1 S40	13.0
	01	165 41.9	164 30.0	33.9	91 04.9	11.9	155 57.4	58.3	194 49.3	15.8	Achernar	335 21.7 S57	07.5
	02	180 44.4	179 29.6	32.6	106 06.4	11.9	170 59.4	58.5	209 51.5	15.7	Acrux	173 01.2 S63	13.5
	03	195 46.8	194 29.3	31.3	121 07.8	12.0	186 01.3	58.7	224 53.7	15.6	Adhara	255 06.8 S29	00.4
	04	210 49.3	209 29.0	30.0	136 09.3	12.1	201 03.3	58.9	239 55.8	15.5	Aldebaran	290 41.3 N16	33.3
	05	225 51.7	224 28.7	28.7	151 10.8	12.1	216 05.3	59.2	254 58.0	15.4			
	06	240 54.2	239 28.4 S 0	27.4	166 12.3 N25	12.2	231 07.2 N 2	59.4	270 00.2 S13	15.3	Alioth	166 13.9 N55	49.9
	07	255 56.7	254 28.0	26.0	181 13.8	12.3	246 09.2	59.6	285 02.4	15.2	Alkaid	152 52.9 N49	11.6
	08	270 59.1	269 27.7	24.7	196 15.2	12.3	261 11.2	2 59.8	300 04.5	15.1	Alnair	27 35.3 S46	51.1
	09	286 01.6	284 27.4	23.4	211 16.7	12.4	276 13.1	3 00.0	315 06.7	15.0	Alnilam	275 39.2 S 1	11.1
	10	301 04.1	299 27.1	22.1	226 18.2	12.5	291 15.1	00.2	330 08.9	14.9	Alphard	217 49.0 S 8	45.6
	11	316 06.5	314 26.8	20.8	241 19.7	12.5	306 17.1	00.5	345 11.1	14.8			
	12	331 09.0	329 26.4 S 0	19.5	256 21.1 N25	12.6	321 19.1 N 3	00.7	0 13.2 S13	14.7	Alphecca	126 05.0 N26	38.0
	13	346 11.5	344 26.1	18.2	271 22.6	12.7	336 21.0	00.9	15 15.4	14.5	Alpheratz	357 36.7 N29	13.0
	14	1 13.9	359 25.8	16.9	286 24.1	12.7	351 23.0	01.1	30 17.6	14.4	Altair	62 01.7 N 8	55.6
	15	16 16.4	14 25.5	15.6	301 25.5	12.8	6 25.0	01.3	45 19.7	14.3	Ankaa	353 09.0 S42	11.1
	16	31 18.9	29 25.2	14.3	316 27.0	12.9	21 26.9	01.5	60 21.9	14.2	Antares	112 17.8 S26	28.9
	17	46 21.3	44 24.9	13.0	331 28.5	12.9	36 28.9	01.8	75 24.1	14.1			
	18	61 23.8	59 24.5 S 0	11.7	346 29.9 N25	13.0	51 30.9 N 3	02.0	90 26.3 S13	14.0	Arcturus	145 49.2 N19	03.5
	19	76 26.2	74 24.2	10.4	1 31.4	13.1	66 32.8	02.2	105 28.4	13.9	Atria	107 13.5 S69	03.9
	20	91 28.7	89 23.9	09.0	16 32.9	13.1	81 34.8	02.4	120 30.6	13.8	Avior	234 14.8 S59	35.1
	21	106 31.2	104 23.6	07.7	31 34.4	13.2	96 36.8	02.6	135 32.8	13.7	Bellatrix	278 24.4 N 6	22.2
	22	121 33.6	119 23.3	06.4	46 35.8	13.3	111 38.7	02.8	150 34.9	13.6	Betelgeuse	270 53.6 N 7	24.6
	23	136 36.1	134 22.9	05.1	61 37.3	13.3	126 40.7	03.1	165 37.1	13.5			
	WEDNESDAY	00	151 38.6	149 22.6 S 0	03.8	76 38.8 N25	13.4	141 42.7 N 3	03.3	180 39.3 S13	13.4	Canopus	263 52.8 S52
01		166 41.0	164 22.3	02.5	91 40.2	13.5	156 44.6	03.5	195 41.5	13.3	Capella	280 24.0 N46	01.4
02		181 43.5	179 22.0 S	01.2	106 41.7	13.5	171 46.6	03.7	210 43.6	13.2	Deneb	49 27.3 N45	21.5
03		196 46.0	194 21.7 N	00.1	121 43.1	13.6	186 48.6	03.9	225 45.8	13.1	Denebola	182 26.2 N14	26.5
04		211 48.4	209 21.3	01.4	136 44.6	13.6	201 50.5	04.2	240 48.0	13.0	Diphda	348 49.1 S17	51.8
05		226 50.9	224 21.0	02.7	151 46.1	13.7	216 52.5	04.4	255 50.2	12.9			
06		241 53.3	239 20.7 N 0	04.0	166 47.5 N25	13.8	231 54.5 N 3	04.6	270 52.3 S13	12.8	Dubhe	193 42.2 N61	37.5
07		256 55.8	254 20.4	05.3	181 49.0	13.8	246 56.4	04.8	285 54.5	12.7	Elnath	278 03.7 N28	37.6
08		271 58.3	269 20.1	06.6	196 50.5	13.9	261 58.4	05.0	300 56.7	12.6	Eltanin	90 43.1 N51	28.8
09		287 00.7	284 19.8	08.0	211 51.9	14.0	277 00.4	05.2	315 58.8	12.5	Enif	33 40.6 N 9	58.7
10		302 03.2	299 19.4	09.3	226 53.4	14.0	292 02.3	05.5	331 01.0	12.4	Fomalhaut	15 16.6 S29	30.2
11		317 05.7	314 19.1	10.6	241 54.8	14.1	307 04.3	05.7	346 03.2	12.3			
12		332 08.1	329 18.8 N 0	11.9	256 56.3 N25	14.2	322 06.3 N 3	05.9	1 05.4 S13	12.2	Gacrux	171 52.9 S57	14.4
13		347 10.6	344 18.5	13.2	271 57.7	14.2	337 08.2	06.1	16 07.5	12.1	Gienah	175 44.9 S17	40.2
14		2 13.1	359 18.2	14.5	286 59.2	14.3	352 10.2	06.3	31 09.7	12.0	Hadar	148 37.9 S60	28.8
15		17 15.5	14 17.9	15.8	302 00.7	14.4	7 12.1	06.5	46 11.9	11.9	Hamal	327 53.1 N23	34.3
16		32 18.0	29 17.5	17.1	317 02.1	14.4	22 14.1	06.8	61 14.1	11.8	Kaus Aust.	83 34.8 S34	22.4
17		47 20.5	44 17.2	18.4	332 03.6	14.5	37 16.1	07.0	76 16.2	11.7			
18		62 22.9	59 16.9 N 0	19.7	347 05.0 N25	14.6	52 18.0 N 3	07.2	91 18.4 S13	11.6	Kochab	137 19.4 N74	03.3
19		77 25.4	74 16.6	21.0	2 06.5	14.6	67 20.0	07.4	106 20.6	11.5	Markab	13 31.8 N15	19.6
20		92 27.8	89 16.3	22.3	17 07.9	14.7	82 22.0	07.6	121 22.7	11.4	Menkar	314 07.9 N 4	10.7
21		107 30.3	104 16.0	23.7	32 09.4	14.7	97 23.9	07.9	136 24.9	11.3	Menkent	147 59.3 S36	28.9
22		122 32.8	119 15.6	25.0	47 10.8	14.8	112 25.9	08.1	151 27.1	11.2	Miaplacidus	221 37.7 S69	48.7
23		137 35.2	134 15.3	26.3	62 12.3	14.9	127 27.9	08.3	166 29.3	11.1			
THURSDAY		00	152 37.7	149 15.0 N 0	27.6	77 13.7 N25	14.9	142 29.8 N 3	08.5	181 31.4 S13	11.0	Mirfak	308 30.6 N49
	01	167 40.2	164 14.7	28.9	92 15.2	15.0	157 31.8	08.7	196 33.6	10.9	Nunki	75 49.9 S26	16.1
	02	182 42.6	179 14.4	30.2	107 16.6	15.1	172 33.8	08.9	211 35.8	10.8	Peacock	53 08.7 S56	39.6
	03	197 45.1	194 14.1	31.5	122 18.1	15.1	187 35.7	09.2	226 38.0	10.7	Pollux	243 18.9 N27	58.2
	04	212 47.6	209 13.7	32.8	137 19.5	15.2	202 37.7	09.4	241 40.1	10.6	Procyon	244 52.2 N 5	09.9
	05	227 50.0	224 13.4	34.1	152 21.0	15.3	217 39.6	09.6	256 42.3	10.5			
	06	242 52.5	239 13.1 N 0	35.4	167 22.4 N25	15.3	232 41.6 N 3	09.8	271 44.5 S13	10.4	Rasalhague	96 00.1 N12	32.4
	07	257 54.9	254 12.8	36.7	182 23.9	15.4	247 43.6	10.0	286 46.6	10.3	Regulus	207 35.8 N11	51.2
	08	272 57.4	269 12.5	38.0	197 25.3	15.5	262 45.5	10.3	301 48.8	10.2	Rigel	281 05.3 S 8	10.6
	09	287 59.9	284 12.2	39.4	212 26.7	15.5	277 47.5	10.5	316 51.0	10.1	Rigel Kent.	139 42.2 S60	55.6
	10	303 02.3	299 11.8	40.7	227 28.2	15.6	292 49.5	10.7	331 53.2	09.9	Sabik	102 04.7 S15	45.2
	11	318 04.8	314 11.5	42.0	242 29.6	15.6	307 51.4	10.9	346 55.3	09.8			
	12	333 07.3	329 11.2 N 0	43.3	257 31.1 N25	15.7	322 53.4 N 3	11.1	1 57.5 S13	09.7	Schedar	349 33.3 N56	39.9
	13	348 09.7	344 10.9	44.6	272 32.5	15.8	337 55.4	11.3	16 59.7	09.6	Shaula	96 12.6 S37	07.1
	14	3 12.2	359 10.6	45.9	287 34.0	15.8	352 57.3	11.6	32 01.9	09.5	Sirius	258 27.4 S16	45.0
	15	18 14.7	14 10.3	47.2	302 35.4	15.9	7 59.3	11.8	47 04.0	09.4	Spica	158 23.7 S11	16.9
	16	33 17.1	29 10.0	48.5	317 36.8	16.0	23 01.2	12.0	62 06.2	09.3	Suhail	222 47.0 S43	31.6
	17	48 19.6	44 09.6	49.8	332 38.3	16.0	38 03.2	12.2	77 08.4	09.2			
	18	63 22.1	59 09.3 N 0	51.1	347 39.7 N25	16.1	53 05.2 N 3	12.4	92 10.5 S13	09.1	Vega	80 34.5 N38	48.0
	19	78 24.5	74 09.0	52.4	2 41.2	16.2	68 07.1	12.7	107 12.7	09.0	Zuben'ubi	136 57.6 S16	08.3
	20	93 27.0	89 08.7	53.7	17 42.6	16.2	83 09.1	12.9	122 14.9	08.9			
	21	108 29.4	104 08.4	55.0	32 44.0	16.3	98 11.1	13.1	137 17.1	08.8			
	22	123 31.9	119 08.1	56.4	47 45.5	16.3	113 13.0	13.3	152 19.2	08.7	Venus	357 44.1 S14	03.3
	23	138 34.4	134 07.8	57.7	62 46.9	16.4	128 15.0	13.5	167 21.4	08.6	Mars	285 00.2 S18	52.0
											Jupiter	350 04.1 S14	31.1
										Saturn	29 00.7 S11	56.6	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise															
										Naut.	Civil		21	22	23	24												
	GHA	Dec	GHA	v	Dec	d	HP																					
d h	°	'	°	'	°	'	'	'	°	h	m	h	m	h	m	h	m	h	m									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18									
TUESDAY	21	00	176	35.3	S10	44.1	165	40.7	9.1	S10	50.8	16.2	60.8	N 72	05	45	07	03	08	16	09	06	08	28	07	53	07	14
	01	191	35.4		43.2	180	08.8	9.2	10	34.6	16.3	60.8	N 70	05	46	06	57	08	01	08	54	08	26	07	59	07	31	
	02	206	35.5		42.3	194	37.0	9.3	10	18.3	16.3	60.7	68	05	47	06	51	07	50	08	44	08	24	08	04	07	44	
	03	221	35.5		41.4	209	05.3	9.4	10	02.0	16.3	60.7	66	05	48	06	47	07	40	08	36	08	22	08	09	07	55	
	04	236	35.6		40.5	223	33.7	9.5	9	45.7	16.4	60.7	64	05	48	06	43	07	32	08	28	08	20	08	12	08	04	
	05	251	35.7		39.6	238	02.2	9.5	9	29.3	16.5	60.7	62	05	49	06	40	07	25	08	22	08	19	08	15	08	12	
	06	266	35.7	S10	38.7	252	30.7	9.6	S	9	12.8	16.5	60.7	60	05	49	06	37	07	19	08	17	08	18	08	18	08	19
	07	281	35.8		37.8	266	59.3	9.7	8	56.3	16.5	60.6	N 58	05	49	06	34	07	14	08	12	08	17	08	21	08	25	
	08	296	35.9		36.9	281	28.0	9.8	8	39.8	16.5	60.6	56	05	49	06	32	07	10	08	08	08	16	08	23	08	31	
	09	311	35.9		36.0	295	56.8	9.9	8	23.3	16.6	60.6	54	05	48	06	29	07	05	08	04	08	15	08	25	08	36	
	10	326	36.0		35.1	310	25.7	9.9	8	06.7	16.6	60.6	52	05	48	06	27	07	01	08	00	08	14	08	27	08	40	
	11	341	36.1		34.2	324	54.6	10.1	7	50.1	16.7	60.5	50	05	48	06	25	06	58	07	57	08	13	08	28	08	44	
	12	356	36.2	S10	33.3	339	23.7	10.0	S	7	33.4	16.7	60.5	45	05	47	06	21	06	50	07	50	08	12	08	32	08	53
	13	11	36.2		32.3	353	52.7	10.2	7	16.7	16.7	60.5	N 40	05	45	06	17	06	44	07	44	08	10	08	35	09	00	
	14	26	36.3		31.4	8	21.9	10.2	7	00.0	16.7	60.4	35	05	43	06	13	06	38	07	39	08	09	08	38	09	07	
	15	41	36.4		30.5	22	51.1	10.3	6	43.3	16.7	60.4	30	05	41	06	09	06	34	07	34	08	08	08	40	09	12	
	16	56	36.4		29.6	37	20.4	10.4	6	26.6	16.8	60.4	20	05	37	06	03	06	25	07	27	08	06	08	45	09	22	
	17	71	36.5		28.7	51	49.8	10.4	6	09.8	16.8	60.4	N 10	05	31	05	56	06	17	07	20	08	05	08	48	09	31	
	18	86	36.6	S10	27.8	66	19.2	10.6	S	5	53.0	16.8	60.3	0	05	25	05	49	06	10	07	13	08	04	08	52	09	39
	19	101	36.7		26.9	80	48.8	10.5	5	36.2	16.8	60.3	S 10	05	16	05	41	06	03	07	07	07	08	02	08	55	09	48
	20	116	36.7		26.0	95	18.3	10.7	5	19.4	16.8	60.3	20	05	06	05	32	05	55	07	00	08	01	08	59	09	57	
	21	131	36.8		25.1	109	48.0	10.7	5	02.6	16.8	60.2	30	04	52	05	21	05	46	06	52	07	59	09	04	10	07	
	22	146	36.9		24.2	124	17.7	10.7	4	45.8	16.9	60.2	35	04	43	05	14	05	40	06	47	07	58	09	06	10	13	
	23	161	37.0		23.3	138	47.4	10.8	4	28.9	16.8	60.2	40	04	32	05	06	05	34	06	42	07	57	09	09	10	20	
	WEDNESDAY	00	176	37.0	S10	22.4	153	17.2	10.9	S	4	12.1	16.9	60.2	45	04	19	04	56	05	27	06	36	07	56	09	13	10
01		191	37.1		21.5	167	47.1	11.0	3	55.2	16.8	60.1	S 50	04	01	04	44	05	18	06	28	07	54	09	17	10	38	
02		206	37.2		20.6	182	17.1	11.0	3	38.4	16.9	60.1	52	03	53	04	38	05	14	06	25	07	53	09	19	10	42	
03		221	37.3		19.6	196	47.1	11.0	3	21.5	16.8	60.1	54	03	43	04	31	05	10	06	21	07	53	09	21	10	47	
04		236	37.3		18.7	211	17.1	11.1	3	04.7	16.9	60.0	56	03	32	04	24	05	05	06	17	07	52	09	23	10	53	
05		251	37.4		17.8	225	47.2	11.2	2	47.8	16.8	60.0	58	03	19	04	16	04	59	06	12	07	51	09	26	10	59	
06		266	37.5	S10	16.9	240	17.4	11.2	S	2	31.0	16.9	60.0	S 60	03	03	04	06	04	53	06	07	07	50	09	29	11	06
07		281	37.6		16.0	254	47.6	11.2	2	14.1	16.8	59.9	Lat.		Sunset		Twilight		Moonset									
08		296	37.6		15.1	269	17.8	11.3	1	57.3	16.8	59.9					Civil		Naut.	21	22	23	24					
09		311	37.7		14.2	283	48.1	11.4	1	40.5	16.9	59.9																
10		326	37.8		13.3	298	18.5	11.4	1	23.6	16.8	59.8																
11		341	37.9		12.4	312	48.9	11.5	1	06.8	16.7	59.8	N 72	16	13	17	26	18	45	18	20	20	46	23	08	25	50	
12		356	38.0	S10	11.4	327	19.4	11.4	S	0	50.1	16.8	59.8	N 70	16	27	17	32	18	43	18	29	20	43	22	54	25	14
13		11	38.0		10.5	341	49.8	11.6	0	33.3	16.8	59.7	68	16	39	17	37	18	42	18	37	20	42	22	43	24	49	
14		26	38.1		09.6	356	20.4	11.6	S	0	16.5	16.7	59.7	66	16	48	17	41	18	41	18	43	20	40	22	35	24	30
15		41	38.2		08.7	10	51.0	11.6	N	0	00.2	16.7	59.6	64	16	56	17	45	18	40	18	48	20	39	22	27	24	15
16		56	38.3		07.8	25	21.6	11.6	0	16.9	16.7	59.6	62	17	03	17	48	18	40	18	52	20	38	22	21	24	03	
17		71	38.4		06.9	39	52.2	11.7	0	33.6	16.7	59.6	60	17	09	17	51	18	40	18	56	20	37	22	15	23	52	
18		86	38.4	S10	06.0	54	22.9	11.8	N	0	50.3	16.6	59.5	N 58	17	14	17	54	18	40	18	59	20	36	22	10	23	43
19		101	38.5		05.1	68	53.7	11.7	1	06.9	16.6	59.5	56	17	18	17	56	18	40	19	02	20	36	22	06	23	35	
20		116	38.6		04.1	83	24.4	11.8	1	23.5	16.6	59.5	54	17	23	17	59	18	40	19	05	20	35	22	02	23	28	
21		131	38.7		03.2	97	55.2	11.9	1	40.1	16.6	59.4	52	17	26	18	01	18	40	19	07	20	34	21	59	23	21	
22		146	38.8		02.3	112	26.1	11.8	1	56.7	16.5	59.4	50	17	30	18	03	18	40	19	09	20	34	21	56	23	16	
23		161	38.8		01.4	126	56.9	11.9	2	13.2	16.5	59.4	45	17	37	18	07	18	41	19	14	20	33	21	49	23	03	
THURSDAY		00	176	38.9	S10	00.5	141	27.8	12.0	N	2	29.7	16.4	59.3	N 40	17	44	18	11	18	42	19	18	20	32	21	43	22
	01	191	39.0	9	59.6	155	58.8	11.9	2	46.1	16.5	59.3	35	17	49	18	15	18	44	19	21	20	31	21	38	22	44	
	02	206	39.1		58.7	170	29.7	12.0	3	02.6	16.3	59.2	30	17	54	18	18	18	46	19	24	20	30	21	34	22	37	
	03	221	39.2		57.7	185	00.7	12.0	3	18.9	16.4	59.2	20	18	02	18	24	18	50	19	29	20	29	21	27	22	24	
	04	236																										

UT	ARIES	VENUS -3.9	MARS +0.3	JUPITER -2.1	SATURN +0.8	STARS			
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA	Dec
24 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	153 36.8	149 07.4 N 0 59.0	77 48.3 N25 16.5	143 16.9 N 3 13.8	182 23.6 S13 08.5	182 23.6 S13 08.5	Acamar	315 13.1 S40 13.0	
	168 39.3	164 07.1 1 00.3	92 49.8 16.5	158 18.9 14.0	197 25.8 08.4	197 25.8 08.4	Achernar	335 21.7 S57 07.5	
	183 41.8	179 06.8 01.6	107 51.2 16.6	173 20.9 14.2	212 27.9 08.3	212 27.9 08.3	Acruz	173 01.2 S63 13.5	
	198 44.2	194 06.5 02.9	122 52.6 16.7	188 22.8 14.4	227 30.1 08.2	227 30.1 08.2	Adhara	255 06.8 S29 00.4	
	213 46.7	209 06.2 04.2	137 54.1 16.7	203 24.8 14.6	242 32.3 08.1	242 32.3 08.1	Aldebaran	290 41.4 N16 33.3	
	228 49.2	224 05.9 05.5	152 55.5 16.8	218 26.7 14.8	257 34.4 08.0	257 34.4 08.0			
	243 51.6	239 05.6 N 1 06.8	167 56.9 N25 16.8	233 28.7 N 3 15.1	272 36.6 S13 07.9	272 36.6 S13 07.9	Alioth	166 13.9 N55 49.9	
	258 54.1	254 05.2 08.1	182 58.4 16.9	248 30.7 15.3	287 38.8 07.8	287 38.8 07.8	Alkaid	152 52.9 N49 11.6	
	273 56.5	269 04.9 09.4	197 59.8 17.0	263 32.6 15.5	302 41.0 07.7	302 41.0 07.7	Alnair	27 35.3 S46 51.1	
	288 59.0	284 04.6 10.7	213 01.2 17.0	278 34.6 15.7	317 43.1 07.6	317 43.1 07.6	Anilam	275 39.2 S 1 11.1	
	304 01.5	299 04.3 12.1	228 02.6 17.1	293 36.5 15.9	332 45.3 07.5	332 45.3 07.5	Alphard	217 49.0 S 8 45.6	
	319 03.9	314 04.0 13.4	243 04.1 17.2	308 38.5 16.2	347 47.5 07.4	347 47.5 07.4			
	334 06.4	329 03.7 N 1 14.7	258 05.5 N25 17.2	323 40.5 N 3 16.4	2 49.7 S13 07.3	2 49.7 S13 07.3	Alphecca	126 05.0 N26 38.0	
	349 08.9	344 03.4 16.0	273 06.9 17.3	338 42.4 16.6	17 51.8 07.2	17 51.8 07.2	Alpheratz	357 36.7 N29 13.0	
	4 11.3	359 03.0 17.3	288 08.4 17.3	353 44.4 16.8	32 54.0 07.1	32 54.0 07.1	Altair	62 01.7 N 8 55.6	
	19 13.8	14 02.7 18.6	303 09.8 17.4	8 46.3 17.0	47 56.2 07.0	47 56.2 07.0	Ankaa	353 09.0 S42 11.1	
	34 16.3	29 02.4 19.9	318 11.2 17.5	23 48.3 17.3	62 58.4 06.9	62 58.4 06.9	Antares	112 17.8 S26 28.9	
	49 18.7	44 02.1 21.2	333 12.6 17.5	38 50.3 17.5	78 00.5 06.8	78 00.5 06.8			
	64 21.2	59 01.8 N 1 22.5	348 14.1 N25 17.6	53 52.2 N 3 17.7	93 02.7 S13 06.7	93 02.7 S13 06.7	Arcturus	145 49.2 N19 03.5	
	79 23.7	74 01.5 23.8	3 15.5 17.7	68 54.2 17.9	108 04.9 06.6	108 04.9 06.6	Atria	107 13.5 S69 03.9	
	94 26.1	89 01.2 25.1	18 16.9 17.7	83 56.1 18.1	123 07.0 06.5	123 07.0 06.5	Avior	234 14.8 S59 35.1	
	109 28.6	104 00.9 26.4	33 18.3 17.8	98 58.1 18.4	138 09.2 06.4	138 09.2 06.4	Bellatrix	278 24.4 N 6 22.2	
	124 31.0	119 00.5 27.7	48 19.7 17.8	114 00.1 18.6	153 11.4 06.3	153 11.4 06.3	Betelgeuse	270 53.6 N 7 24.6	
139 33.5	134 00.2 29.0	63 21.2 17.9	129 02.0 18.8	168 13.6 06.2	168 13.6 06.2				
25 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	154 36.0	148 59.9 N 1 30.4	78 22.6 N25 18.0	144 04.0 N 3 19.0	183 15.7 S13 06.1	183 15.7 S13 06.1	Canopus	263 52.8 S52 42.7	
	169 38.4	163 59.6 31.7	93 24.0 18.0	159 05.9 19.2	198 17.9 06.0	198 17.9 06.0	Capella	280 24.1 N46 01.4	
	184 40.9	178 59.3 33.0	108 25.4 18.1	174 07.9 19.5	213 20.1 05.9	213 20.1 05.9	Deneb	49 27.3 N45 21.5	
	199 43.8	193 59.0 34.3	123 26.8 18.1	189 09.9 19.7	228 22.3 05.8	228 22.3 05.8	Denebola	182 26.2 N14 26.5	
	214 45.4	208 58.7 35.6	138 28.3 18.2	204 11.8 19.9	243 24.4 05.7	243 24.4 05.7	Diphda	348 49.1 S17 51.8	
	229 48.3	223 58.4 36.9	153 29.7 18.3	219 13.8 20.1	258 26.6 05.6	258 26.6 05.6			
	244 50.8	238 58.0 N 1 38.2	168 31.1 N25 18.3	234 15.7 N 3 20.3	273 28.8 S13 05.5	273 28.8 S13 05.5	Dubhe	193 42.2 N61 37.5	
	259 53.2	253 57.7 39.5	183 32.5 18.4	249 17.7 20.6	288 31.0 05.4	288 31.0 05.4	El Nath	278 03.7 N28 37.6	
	274 55.7	268 57.4 40.8	198 33.9 18.5	264 19.7 20.8	303 33.1 05.2	303 33.1 05.2	Eltanin	90 43.1 N51 28.8	
	289 58.2	283 57.1 42.1	213 35.3 18.5	279 21.6 21.0	318 35.3 05.1	318 35.3 05.1	Enif	33 40.6 N 9 58.8	
	305 00.6	298 56.8 43.4	228 36.8 18.6	294 23.6 21.2	333 37.5 05.0	333 37.5 05.0	Fomalhaut	15 16.6 S29 30.2	
	320 03.1	313 56.5 44.7	243 38.2 18.6	309 25.5 21.4	348 39.7 04.9	348 39.7 04.9			
	335 05.5	328 56.2 N 1 46.0	258 39.6 N25 18.7	324 27.5 N 3 21.7	3 41.8 S13 04.8	3 41.8 S13 04.8	Gacrux	171 52.9 S57 14.4	
	350 08.0	343 55.9 47.3	273 41.0 18.8	339 29.4 21.9	18 44.0 04.7	18 44.0 04.7	Gienah	175 44.9 S17 40.2	
	5 10.5	358 55.5 48.6	288 42.4 18.8	354 31.4 22.1	33 46.2 04.6	33 46.2 04.6	Hadar	148 37.7 S60 28.8	
	20 12.9	13 55.2 50.0	303 43.8 18.9	9 33.4 22.3	48 48.3 04.5	48 48.3 04.5	Hamal	327 53.1 N23 34.3	
	35 15.4	28 54.9 51.3	318 45.2 18.9	24 35.3 22.5	63 50.5 04.4	63 50.5 04.4	Kaus Aust.	83 34.8 S34 22.4	
	50 17.9	43 54.6 52.6	333 46.6 19.0	39 37.3 22.8	78 52.7 04.3	78 52.7 04.3			
	65 20.3	58 54.3 N 1 53.9	348 48.0 N25 19.1	54 39.2 N 3 23.0	93 54.9 S13 04.2	93 54.9 S13 04.2	Kochab	137 19.3 N74 03.3	
	80 22.8	73 54.0 55.2	3 49.4 19.1	69 41.2 23.2	108 57.0 04.1	108 57.0 04.1	Markab	13 31.8 N15 19.6	
	95 25.3	88 53.7 56.5	18 50.9 19.2	84 43.1 23.4	123 59.2 04.0	123 59.2 04.0	Menkar	314 07.9 N 4 10.7	
	110 27.7	103 53.4 57.8	33 52.3 19.2	99 45.1 23.6	139 01.4 03.9	139 01.4 03.9	Menkent	147 59.2 S36 28.9	
	125 30.2	118 53.0 1 59.1	48 53.7 19.3	114 47.1 23.9	154 03.6 03.8	154 03.6 03.8	Miaplacidus	221 37.7 S69 48.8	
140 32.6	133 52.7 2 00.4	63 55.1 19.4	129 49.0 24.1	169 05.7 03.7	169 05.7 03.7				
26 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	155 35.1	148 52.4 N 2 01.7	78 56.5 N25 19.4	144 51.0 N 3 24.3	184 07.9 S13 03.6	184 07.9 S13 03.6	Mirfak	308 30.6 N49 56.6	
	170 37.6	163 52.1 03.0	93 57.9 19.5	159 52.9 24.5	199 10.1 03.5	199 10.1 03.5	Nunki	75 49.9 S26 16.1	
	185 40.0	178 51.8 04.3	108 59.3 19.5	174 54.9 24.7	214 12.3 03.4	214 12.3 03.4	Peacock	53 08.7 S56 39.6	
	200 42.5	193 51.5 05.6	124 00.7 19.6	189 56.8 25.0	229 14.4 03.3	229 14.4 03.3	Pollux	243 18.9 N27 58.2	
	215 45.0	208 51.2 06.9	139 02.1 19.7	204 58.8 25.2	244 16.6 03.2	244 16.6 03.2	Procyon	244 52.2 N 5 09.9	
	230 47.4	223 50.9 08.2	154 03.5 19.7	220 00.8 25.4	259 18.8 03.1	259 18.8 03.1			
	245 49.9	238 50.5 N 2 09.5	169 04.9 N25 19.8	235 02.7 N 3 25.6	274 21.0 S13 03.0	274 21.0 S13 03.0	Rasalhague	96 00.1 N12 32.4	
	260 52.4	253 50.2 10.9	184 06.3 19.8	250 04.7 25.8	289 23.1 02.9	289 23.1 02.9	Regulus	207 35.8 N11 51.2	
	275 54.8	268 49.9 12.2	199 07.7 19.9	265 06.6 26.1	304 25.3 02.8	304 25.3 02.8	Rigel	281 05.3 S 8 10.6	
	290 57.3	283 49.6 13.5	214 09.1 20.0	280 08.6 26.3	319 27.5 02.7	319 27.5 02.7	Rigel Kent.	139 42.2 S60 55.6	
	305 59.8	298 49.3 14.8	229 10.5 20.0	295 10.5 26.5	334 29.7 02.6	334 29.7 02.6	Sabik	102 04.6 S15 45.2	
	321 02.2	313 49.0 16.1	244 11.9 20.1	310 12.5 26.7	349 31.8 02.5	349 31.8 02.5			
	336 04.7	328 48.7 N 2 17.4	259 13.3 N25 20.1	325 14.4 N 3 26.9	4 34.0 S13 02.4	4 34.0 S13 02.4	Schedar	349 33.3 N56 39.9	
	351 07.1	343 48.4 18.7	274 14.7 20.2	340 16.4 27.2	19 36.2 02.3	19 36.2 02.3	Shaula	96 12.6 S37 07.1	
	6 09.6	358 48.1 20.0	289 16.1 20.3	355 18.4 27.4	34 38.3 02.2	34 38.3 02.2	Sirius	258 27.4 S16 45.0	
	21 12.1	13 47.7 21.3	304 17.5 20.3	10 20.3 27.6	49 40.5 02.1	49 40.5 02.1	Spica	158 23.7 S11 17.0	
	36 14.5	28 47.4 22.6	319 18.9 20.4	25 22.3 27.8	64 42.7 02.0	64 42.7 02.0	Suhail	222 47.0 S43 31.6	
	51 17.0	43 47.1 23.9	334 20.3 20.4	40 24.2 28.1	79 44.9 01.9	79 44.9 01.9			
	66 19.5	58 46.8 N 2 25.2	349 21.7 N25 20.5	55 26.2 N 3 28.3	94 47.0 S13 01.8	94 47.0 S13 01.8	Vega	80 34.5 N38 48.0	
	81 21.9	73 46.5 26.5	4 23.1 20.6	70 28.1 28.5	109 49.2 01.7	109 49.2 01.7	Zuben'ubi	136 57.6 S16 08.3	
	96 24.4	88 46.2 27.8	19 24.5 20.6	85 30.1 28.7	124 51.4 01.6	124 51.4 01.6			
	111 26.9	103 45.9 29.1	34 25.9 20.7	100 32.0 28.9	139 53.6 01.5	139 53.6 01.5			
	126 29.3	118 45.6 30.4	49 27.3 20.7	115 34.0 29.2	154 55.7 01.4	154 55.7 01.4	Venus	354 23.9 14 04	
141 31.8	133 45.2 31.7	64 28.6 20.8	130 36.0 29.4	169 57.9 01.3	169 57.9 01.3	Mars	283 46.6 18 45		
						Jupiter	349 28.0 14 22		
						Saturn	28 39.8 11 45		
	h m								
Mer.Pass.	13 39.4	v -0.3 d 1.3	v 1.4 d 0.1	v 2.0 d 0.2	v 2.2 d 0.1				

UT	SUN			MOON				Lat.	Twilight		Sunrise	Moonrise				
									Naut.	Civil		24	25	26	27	
	GHA	Dec		GHA	γ	Dec	d									HP
24 FRI DAY	^{d h}	[°]	[']	[°]	[']	[°]	[']	[°]	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}
	N 72	05	31	06	49	08	00	07	14	06	15					
	N 70	05	34	06	44	07	47	07	31	06	52					
	68	05	36	06	40	07	37	07	44	07	18	06	33			
	66	05	38	06	37	07	29	07	55	07	39	07	15			
	64	05	39	06	34	07	22	08	04	07	55	07	44	07	26	
	62	05	40	06	31	07	16	08	12	08	09	08	06	08	04	
	60	05	41	06	29	07	11	08	19	08	21	08	24	08	31	
	N 58	05	41	06	27	07	06	08	25	08	31	08	39	08	53	
	56	05	42	06	25	07	02	08	31	08	40	08	52	09	10	
	54	05	42	06	23	06	59	08	36	08	48	09	04	09	25	
	52	05	42	06	21	06	55	08	40	08	55	09	14	09	38	
	50	05	42	06	19	06	52	08	44	09	02	09	23	09	49	
	45	05	42	06	16	06	45	08	53	09	16	09	42	10	13	
	N 40	05	41	06	12	06	40	09	00	09	27	09	57	10	32	
	35	05	40	06	09	06	35	09	07	09	37	10	10	10	48	
	30	05	39	06	06	06	31	09	12	09	46	10	22	11	02	
	20	05	35	06	01	06	23	09	22	10	01	10	42	11	26	
	N 10	05	30	05	55	06	16	09	31	10	14	10	59	11	47	
	0	05	24	05	49	06	10	09	39	10	27	11	16	12	06	
	S 10	05	17	05	42	06	03	09	48	10	40	11	32	12	25	
	20	05	07	05	34	05	56	09	57	10	53	11	50	12	46	
	30	04	54	05	23	05	48	10	07	11	09	12	11	13	11	
	35	04	46	05	17	05	43	10	13	11	18	12	23	13	25	
40	04	36	05	09	05	37	10	20	11	29	12	37	13	42		
45	04	24	05	00	05	31	10	28	11	42	12	53	14	02		
25 SAT URDAY	S 50	04	08	04	49	05	23	10	38	11	57	13	14	14	27	
	52	04	00	04	44	05	20	10	42	12	04	13	24	14	40	
	54	03	51	04	38	05	16	10	47	12	12	13	35	14	54	
	56	03	41	04	31	05	11	10	53	12	21	13	48	15	10	
	58	03	29	04	24	05	06	10	59	12	31	14	02	15	30	
	S 60	03	15	04	15	05	01	11	06	12	43	14	20	15	55	
	06	266	43.7	S 9	10.7	205	31.0	12.0	N15	55.9	12.8	57.2				
	07	281	43.8	09.8	220	02.0	11.9	16	08.7	12.8	57.1					
	08	296	43.9	08.8	234	32.9	11.9	16	21.5	12.6	57.1					
	09	311	44.0	07.9	249	03.8	11.9	16	34.1	12.5	57.1					
	10	326	44.1	07.0	263	34.7	11.8	16	46.6	12.4	57.0					
	11	341	44.2	06.1	278	05.5	11.8	16	59.0	12.3	57.0					
	12	356	44.3	S 9	05.1	292	36.3	11.8	N17	11.3	12.2	56.9				
	13	11	44.4	04.2	307	07.1	11.8	17	23.5	12.2	56.9					
	14	26	44.5	03.3	321	37.9	11.7	17	35.7	12.0	56.9					
	15	41	44.6	02.3	336	08.6	11.7	17	47.7	11.9	56.8					
	16	56	44.7	01.4	350	39.3	11.7	17	59.6	11.8	56.8					
	17	71	44.8	9 00.5	5	10.0	11.7	18	11.4	11.7	56.8					
	18	86	44.9	S 8	59.5	19	40.7	11.6	N18	23.1	11.7	56.7				
	19	101	45.0	58.6	34	11.3	11.6	18	34.8	11.5	56.7					
	20	116	45.1	57.7	48	41.9	11.6	18	46.3	11.4	56.6					
	21	131	45.2	56.7	63	12.5	11.5	18	57.7	11.3	56.6					
	22	146	45.3	55.8	77	43.0	11.5	19	09.0	11.1	56.6					
	23	161	45.4	54.9	92	13.5	11.5	19	20.1	11.1	56.5					
26 SUN DAY	00	176	45.5	S 8	54.0	106	44.0	11.5	N19	31.2	11.0	56.5				
	01	191	45.6	53.0	121	14.5	11.4	19	42.2	10.9	56.5					
	02	206	45.7	52.1	135	44.9	11.4	19	53.1	10.7	56.4					
	03	221	45.8	51.2	150	15.3	11.3	20	03.8	10.7	56.4					
	04	236	45.9	50.2	164	45.6	11.3	20	14.5	10.5	56.4					
	05	251	46.0	49.3	179	15.9	11.3	20	25.0	10.4	56.3					
	06	266	46.1	S 8	48.3	193	46.2	11.3	N20	35.4	10.3	56.3				
	07	281	46.2	47.4	208	16.5	11.2	20	45.7	10.2	56.3					
	08	296	46.3	46.5	222	46.7	11.2	20	55.9	10.1	56.2					
	09	311	46.4	45.5	237	16.9	11.2	21	06.0	10.0	56.2					
	10	326	46.5	44.6	251	47.1	11.1	21	16.0	9.8	56.2					
	11	341	46.6	43.7	266	17.2	11.1	21	25.8	9.8	56.1					
	12	356	46.7	S 8	42.7	280	47.3	11.1	N21	35.6	9.6	56.1				
	13	11	46.8	41.8	295	17.4	11.0	21	45.2	9.5	56.1					
	14	26	46.9	40.9	309	47.4	11.0	21	54.7	9.4	56.0					
	15	41	47.0	39.9	324	17.4	11.0	22	04.1	9.2	56.0					
	16	56	47.1	39.0	338	47.4	10.9	22	13.3	9.2	56.0					
	17	71	47.2	38.1	353	17.3	10.9	22	22.5	9.0	55.9					
	18	86	47.3	S 8	37.1	7	47.2	10.9	N22	31.5	8.9	55.9				
	19	101	47.5	36.2	22	17.1	10.8	22	40.4	8.8	55.9					
	20	116	47.6	35.3	36	46.9	10.8	22	49.2	8.7	55.8					
	21	131	47.7	34.3	51	16.7	10.8	22	57.9	8.6	55.8					
	22	146	47.8	33.4	65	46.5	10.7	23	06.5	8.4	55.8					
	23	161	47.9	32.4	80	16.2	10.7	N23	14.9	8.3	55.7					
SD 16.2 d 0.9 SD 15.8 15.5 15.3																
								SUN		MOON						
								Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
									00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
								24	13 16	13 12	12 13	15 51	03 27	04	22	
								25	13 08	13 03	12 13	16 39	04 15	05	32	
								26	12 58	12 53	12 13	17 28	05 03	06	42	

UT	ARIES		VENUS −3.9		MARS +0.4		JUPITER −2.1		SATURN +0.8		STARS		
	GHA	GHA Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
MONDAY	27 00	156 34.3	148 44.9 N 2	33.0	79 30.0 N25	20.8	145 37.9 N 3	29.6	185 00.1 S13	01.2	Acamar	315 13.1 S40	13.0
	01	171 36.7	163 44.6	34.3	94 31.4	20.9	160 39.9	29.8	200 02.3	01.1	Achernar	335 21.7 S57	07.5
	02	186 39.2	178 44.3	35.6	109 32.8	21.0	175 41.8	30.0	215 04.4	01.0	Acruhr	173 01.2 S63	13.5
	03	201 41.6	193 44.0	36.9	124 34.2	21.0	190 43.8	30.3	230 06.6	00.9	Adhara	255 06.9 S29	00.4
	04	216 44.1	208 43.7	38.2	139 35.6	21.1	205 45.7	30.5	245 08.8	00.8	Aldebaran	290 41.4 N16	33.3
	05	231 46.6	223 43.4	39.6	154 37.0	21.1	220 47.7	30.7	260 11.0	00.7			
	06	246 49.0	238 43.1 N 2	40.9	169 38.4 N25	21.2	235 49.6 N 3	30.9	275 13.1 S13	00.6	Alioth	166 13.9 N55	49.9
	07	261 51.5	253 42.8	42.2	184 39.8	21.3	250 51.6	31.2	290 15.3	00.5	Alkaid	152 52.9 N49	11.6
	08	276 54.0	268 42.4	43.5	199 41.2	21.3	265 53.5	31.4	305 17.5	00.4	Alnair	27 35.3 S46	51.1
	09	291 56.4	283 42.1	44.8	214 42.5	21.4	280 55.5	31.6	320 19.7	00.3	Alnilam	275 39.2 S 1	11.3
	10	306 58.9	298 41.8	46.1	229 43.9	21.4	295 57.4	31.8	335 21.8	00.2	Alphard	217 49.0 S 8	45.6
	11	322 01.4	313 41.5	47.4	244 45.3	21.5	310 59.4	32.0	350 24.0	13 00.0			
	12	337 03.8	328 41.2 N 2	48.7	259 46.7 N25	21.5	326 01.4 N 3	32.3	5 26.2 S12	59.9	Alphecca	126 05.0 N26	38.0
	13	352 06.3	343 40.9	50.0	274 48.1	21.6	341 03.3	32.5	20 28.4	59.8	Alpheratz	357 36.7 N29	13.0
	14	7 08.7	358 40.6	51.3	289 49.5	21.7	356 05.3	32.7	35 30.5	59.7	Altair	62 01.7 N 8	55.6
	15	22 11.2	13 40.3	52.6	304 50.8	21.7	11 07.2	32.9	50 32.7	59.6	Ankaa	353 09.0 S42	11.1
	16	37 13.7	28 40.0	53.9	319 52.2	21.8	26 09.2	33.1	65 34.9	59.5	Antares	112 17.7 S26	29.0
	17	52 16.1	43 39.6	55.2	334 53.6	21.8	41 11.1	33.4	80 37.1	59.4			
	18	67 18.6	58 39.3 N 2	56.5	349 55.0 N25	21.9	56 13.1 N 3	33.6	95 39.2 S12	59.3	Arcturus	145 49.1 N19	03.5
	19	82 21.1	73 39.0	57.8	4 56.4	21.9	71 15.0	33.8	110 41.4	59.2	Atria	107 13.4 S69	03.9
	20	97 23.5	88 38.7	5 29.1	19 57.8	22.0	86 17.0	34.0	125 43.6	59.1	Avior	234 14.8 S59	35.1
	21	112 26.0	103 38.4	3 00.4	34 59.1	22.1	101 18.9	34.3	140 45.8	59.0	Bellatrix	278 24.5 N 6	22.2
	22	127 28.5	118 38.1	01.7	50 00.5	22.1	116 20.9	34.5	155 47.9	58.9	Betelgeuse	270 53.6 N 7	24.6
	23	142 30.9	133 37.8	03.0	65 01.9	22.2	131 22.8	34.7	170 50.1	58.8			
	TUESDAY	28 00	157 33.4	148 37.5 N 3	04.3	80 03.3 N25	22.2	146 24.8 N 3	34.9	185 52.3 S12	58.7	Canopus	263 52.8 S52
01		172 35.9	163 37.2	05.6	95 04.6	22.3	161 26.7	35.1	200 54.5	58.6	Capella	280 24.1 N46	01.4
02		187 38.3	178 36.8	06.9	110 06.0	22.3	176 28.7	35.4	215 56.6	58.5	Deneb	49 27.3 N45	21.5
03		202 40.8	193 36.5	08.2	125 07.4	22.4	191 30.6	35.6	230 58.8	58.4	Denebola	182 26.2 N14	26.5
04		217 43.2	208 36.2	09.5	140 08.8	22.5	206 32.6	35.8	246 01.0	58.3	Diphda	348 49.1 S17	51.8
05		232 45.7	223 35.9	10.8	155 10.1	22.5	221 34.5	36.0	261 03.2	58.2			
06		247 48.2	238 35.6 N 3	12.1	170 11.5 N25	22.6	236 36.5 N 3	36.2	276 05.3 S12	58.1	Dubhe	193 42.2 N61	37.5
07		262 50.6	253 35.3	13.4	185 12.9	22.6	251 38.4	36.5	291 07.5	58.0	Elnath	278 03.7 N28	37.6
08		277 53.1	268 35.0	14.7	200 14.3	22.7	266 40.4	36.7	306 09.7	57.9	Eltanin	90 43.1 N51	28.8
09		292 55.6	283 34.7	16.0	215 15.6	22.7	281 42.3	36.9	321 11.9	57.8	Enif	33 40.6 N 9	58.7
10		307 58.0	298 34.4	17.3	230 17.0	22.8	296 44.3	37.1	336 14.0	57.7	Fomalhaut	15 16.6 S29	30.2
11		323 00.5	313 34.0	18.6	245 18.4	22.8	311 46.3	37.4	351 16.2	57.6			
12		338 03.0	328 33.7 N 3	19.9	260 19.8 N25	22.9	326 48.2 N 3	37.6	6 18.4 S12	57.5	Gacrux	171 52.9 S57	14.4
13		353 05.4	343 33.4	21.2	275 21.1	23.0	341 50.2	37.8	21 20.6	57.4	Gienah	175 44.9 S17	40.2
14		8 07.9	358 33.1	22.5	290 22.5	23.0	356 52.1	38.0	36 22.7	57.3	Hadar	148 37.8 S60	28.9
15		23 10.4	13 32.8	23.8	305 23.9	23.1	11 54.1	38.2	51 24.9	57.2	Hamal	327 53.1 N23	34.3
16		38 12.8	28 32.5	25.1	320 25.2	23.1	26 56.0	38.5	66 27.1	57.1	Kaus Aust.	83 34.7 S34	22.4
17		53 15.3	43 32.2	26.4	335 26.6	23.2	41 58.0	38.7	81 29.3	57.0			
18		68 17.7	58 31.9 N 3	27.7	350 28.0 N25	23.2	56 59.9 N 3	38.9	96 31.4 S12	56.9	Kochab	137 19.3 N74	03.3
19		83 20.2	73 31.6	29.0	5 29.3	23.3	72 01.9	39.1	111 33.6	56.8	Markab	13 31.8 N15	19.6
20		98 22.7	88 31.2	30.3	20 30.7	23.3	87 03.8	39.4	126 35.8	56.7	Menkar	314 07.9 N 4	10.7
21		113 25.1	103 30.9	31.6	35 32.1	23.4	102 05.8	39.6	141 38.0	56.6	Menkent	147 59.2 S36	28.9
22		128 27.6	118 30.6	32.9	50 33.4	23.5	117 07.7	39.8	156 40.1	56.5	Miaplacidus	221 37.7 S69	48.8
23		143 30.1	133 30.3	34.2	65 34.8	23.5	132 09.7	40.0	171 42.3	56.4			
WEDNESDAY		1 00	158 32.5	148 30.0 N 3	35.5	80 36.2 N25	23.6	147 11.6 N 3	40.2	186 44.5 S12	56.3	Mirfak	308 30.6 N49
	01	173 35.0	163 29.7	36.8	95 37.5	23.6	162 13.6	40.5	201 46.7	56.2	Nunki	75 49.9 S26	16.1
	02	188 37.5	178 29.4	38.1	110 38.9	23.7	177 15.5	40.7	216 48.9	56.1	Peacock	53 08.6 S56	39.6
	03	203 39.9	193 29.1	39.4	125 40.3	23.7	192 17.5	40.9	231 51.0	56.0	Pollux	243 18.9 N27	58.2
	04	218 42.4	208 28.8	40.7	140 41.6	23.8	207 19.4	41.1	246 53.2	55.9	Procyon	244 52.2 N 5	09.9
	05	233 44.9	223 28.4	42.0	155 43.0	23.8	222 21.4	41.4	261 55.4	55.8			
	06	248 47.3	238 28.1 N 3	43.3	170 44.3 N25	23.9	237 23.3 N 3	41.6	276 57.6 S12	55.7	Rasalhague	96 00.1 N12	32.4
	07	263 49.8	253 27.8	44.6	185 45.7	23.9	252 25.3	41.8	291 59.7	55.6	Regulus	207 35.8 N11	51.2
	08	278 52.2	268 27.5	45.9	200 47.1	24.0	267 27.2	42.0	307 01.9	55.5	Rigel	281 05.3 S 8	10.7
	09	293 54.7	283 27.2	47.2	215 48.4	24.1	282 29.2	42.3	322 04.1	55.4	Rigel Kent.	139 42.1 S60	55.6
	10	308 57.2	298 26.9	48.5	230 49.8	24.1	297 31.1	42.5	337 06.3	55.3	Sabik	102 04.6 S15	45.2
	11	323 59.6	313 26.6	49.8	245 51.1	24.2	312 33.1	42.7	352 08.4	55.2			
	12	339 02.1	328 26.3 N 3	51.1	260 52.5 N25	24.2	327 35.0 N 3	42.9	7 10.6 S12	55.1	Schedar	349 33.3 N56	39.9
	13	354 04.6	343 25.9	52.4	275 53.9	24.3	342 36.9	43.1	22 12.8	55.0	Shaula	96 12.6 S37	07.1
	14	9 07.0	358 25.6	53.7	290 55.2	24.3	357 38.9	43.4	37 15.0	54.9	Sirius	258 27.4 S16	45.0
	15	24 09.5	13 25.3	55.0	305 56.6	24.4	12 40.8	43.6	52 17.1	54.8	Spica	158 23.7 S11	17.0
	16	39 12.0	28 25.0	56.3	320 57.9	24.4	27 42.8	43.8	67 19.3	54.7	Suhail	222 47.0 S43	31.7
	17	54 14.4	43 24.7	57.6	335 59.3	24.5	42 44.7	44.0	82 21.5	54.6			
	18	69 16.9	58 24.4 N 3	58.9	351 00.6 N25	24.5	57 46.7 N 3	44.3	97 23.7 S12	54.5	Vega	80 34.5 N38	48.0
	19	84 19.4	73 24.1	4 00.2	6 02.0	24.6	72 48.6	44.5	112 25.8	54.4	Zuben'ubi	136 57.6 S16	08.3
	20	99 21.8	88 23.8	01.5	21 03.4	24.6	87 50.6	44.7	127 28.0	54.3			
	21	114 24.3	103 23.5	02.8	36 04.7	24.7	102 52.5	44.9	142 30.2	54.2		SHA	Mer.Pass.
	22	129 26.7	118 23.1	04.1	51 06.1	24.7	117 54.5	45.2	157 32.4	54.1	Venus	351 04.1 S 14	06 h m
	23	144 29.2	133 22.8	05.3	66 07.4	24.8	132 56.4	45.4	172 34.5	54.0	Mars	282 29.9 S 18	38 h m
											Jupiter	348 51.4 S 14	12 h m
										Saturn	28 18.9 S 11	35 h m	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	27		28	1	2	
											h m		h m	h m	h m	h m
MONDAY	d h	° / °	° / °	° / °	° / °	° / °	° / °	N 72	h m	h m	h m	h m	h m	h m	h m	h m
	27 00	176 48.0 S 8 31.5	94 45.9 10.7	N23 23.2	8.2 55.7			N 70	05 21	06 31	07 33	07 25	08 04	08 05	08 20	09 28
	01	191 48.1 30.6	109 15.6 10.6	23 31.4 8.0 55.7	68	05 24	06 28	07 25	66	05 27	06 26	07 18	07 26			
	02	206 48.2 29.6	123 45.2 10.6	23 39.4 8.0 55.6	64	05 29	06 24	07 12	62	05 31	06 22	07 07	08 04			
	03	221 48.3 28.7	138 14.8 10.6	23 47.4 7.8 55.6	66	05 31	06 22	07 07	60	05 32	06 20	07 02	08 31	08 47	09 20	10 20
	04	236 48.4 27.7	152 44.4 10.5	23 55.2 7.7 55.6	62	05 34	06 19	06 58	N 58	05 34	06 17	06 55	08 53	09 15	09 53	10 51
	05	251 48.5 26.8	167 13.9 10.6	24 02.9 7.5 55.6	56	05 35	06 16	06 52	56	05 34	06 17	06 55	09 10	09 37	10 18	11 15
	06	266 48.6 S 8 25.9	181 43.5 10.4	N24 10.4 7.5 55.5	54	05 35	06 16	06 52	54	05 35	06 16	06 52	09 25	09 55	10 38	11 34
	07	281 48.7 24.9	196 12.9 10.5	24 17.9 7.3 55.5	52	05 36	06 15	06 49	52	05 36	06 15	06 49	09 38	10 11	10 54	11 50
	08	296 48.8 24.0	210 42.4 10.4	24 25.2 7.2 55.5	50	05 36	06 14	06 46	50	05 36	06 14	06 46	09 49	10 24	11 09	12 04
	09	311 49.0 23.0	225 11.8 10.4	24 32.4 7.0 55.4	45	05 37	06 11	06 40	45	05 37	06 11	06 40	10 13	10 51	11 38	12 33
	10	326 49.1 22.1	239 41.2 10.4	24 39.4 7.0 55.4	N 40	05 37	06 08	06 35	N 40	05 37	06 08	06 35	10 32	11 13	12 01	12 55
	11	341 49.2 21.2	254 10.6 10.3	24 46.4 6.8 55.4	35	05 36	06 06	06 31	35	05 36	06 06	06 31	10 48	11 31	12 20	13 13
	12	356 49.3 S 8 20.2	268 39.9 10.3	N24 53.2 6.6 55.4	30	05 36	06 03	06 27	30	05 36	06 03	06 27	11 02	11 47	12 36	13 29
	13	11 49.4 19.3	283 09.2 10.3	24 59.8 6.6 55.3	20	05 33	05 59	06 21	20	05 33	05 59	06 21	11 26	12 13	13 03	13 56
	14	26 49.5 18.3	297 38.5 10.3	25 06.4 6.4 55.3	N 10	05 29	05 54	06 15	N 10	05 29	05 54	06 15	11 47	12 36	13 27	14 19
	15	41 49.6 17.4	312 07.8 10.2	25 12.8 6.3 55.3	0	05 24	05 48	06 09	0	05 24	05 48	06 09	12 06	12 57	13 49	14 40
	16	56 49.7 16.5	326 37.0 10.2	25 19.1 6.1 55.3	S 10	05 17	05 42	06 03	S 10	05 17	05 42	06 03	12 25	13 19	14 11	15 02
	17	71 49.8 15.5	341 06.2 10.2	25 25.2 6.0 55.2	20	05 09	05 35	05 57	20	05 09	05 35	05 57	12 46	13 42	14 35	15 24
	18	86 49.9 S 8 14.6	355 35.4 10.2	N25 31.2 5.9 55.2	30	04 57	05 26	05 50	30	04 57	05 26	05 50	13 11	14 08	15 02	15 51
	19	101 50.1 13.6	10 04.6 10.1	25 37.1 5.8 55.2	35	04 49	05 20	05 46	35	04 49	05 20	05 46	13 25	14 24	15 19	16 07
	20	116 50.2 12.7	24 33.7 10.1	25 42.9 5.6 55.2	40	04 40	05 13	05 41	40	04 40	05 13	05 41	13 42	14 43	15 38	16 25
	21	131 50.3 11.8	39 02.8 10.1	25 48.5 5.5 55.1	45	04 28	05 05	05 35	45	04 28	05 05	05 35	14 02	15 05	16 01	16 47
	22	146 50.4 10.8	53 31.9 10.0	25 54.0 5.4 55.1	S 50	04 28	05 05	05 35	S 50	04 28	05 05	05 35	14 27	15 34	16 30	17 15
	23	161 50.5 09.9	68 00.9 10.1	25 59.4 5.2 55.1	52	04 06	04 50	05 25	52	04 06	04 50	05 25	14 40	15 48	16 45	17 28
TUESDAY	28 00	176 50.6 S 8 08.9	82 30.0 10.0	N26 04.6 5.1 55.1	54	03 58	04 45	05 22	54	03 58	04 45	05 22	14 54	16 04	17 01	17 44
	01	191 50.7 08.0	96 59.0 10.0	26 09.7 5.0 55.0	56	03 49	04 38	05 18	56	03 49	04 38	05 18	15 10	16 24	17 22	18 02
	02	206 50.8 07.0	111 28.0 10.0	26 14.7 4.8 55.0	58	03 38	04 32	05 14	58	03 38	04 32	05 14	15 30	16 48	17 47	18 25
	03	221 51.0 06.1	125 57.0 9.9	26 19.5 4.7 55.0	S 60	03 25	04 24	05 09	S 60	03 25	04 24	05 09	15 55	17 20	18 22	18 54
	04	236 51.1 05.2	140 25.9 10.0	26 24.2 4.6 55.0												
	05	251 51.2 04.2	154 54.9 9.9	26 28.8 4.4 54.9	Lat.	Sunset	Twilight		Moonset							
	06	266 51.3 S 8 03.3	169 23.8 9.9	N26 33.2 4.3 54.9			Civil	Naut.	27	28	1	2				
	07	281 51.4 02.3	183 52.7 9.9	26 37.5 4.2 54.9												
	08	296 51.5 01.4	198 21.6 9.9	26 41.7 4.0 54.9												
	09	311 51.6 8 00.4	212 50.5 9.9	26 45.7 3.9 54.9												
	10	326 51.8 7 59.5	227 19.4 9.8	26 49.6 3.7 54.8												
	11	341 51.9 58.5	241 48.2 9.9	26 53.3 3.7 54.8	N 72	h m	h m	h m	h m	h m	h m	h m				
	12	356 52.0 S 7 57.6	256 17.1 9.8	N26 57.0 3.5 54.8	N 70	16 43	17 53	19 12								
	13	11 52.1 56.6	270 45.9 9.8	27 00.5 3.3 54.8	68	17 02	17 59	19 03								
	14	26 52.2 55.7	285 14.7 9.8	27 03.8 3.2 54.7	66	17 09	18 01	19 00								
	15	41 52.3 54.8	299 43.5 9.8	27 07.0 3.1 54.7	64	17 15	18 03	18 58	04 09							
	16	56 52.4 53.8	314 12.3 9.8	27 10.1 2.9 54.7	62	17 20	18 04	18 56	03 31	05 17	06 50	07 29				
	17	71 52.6 52.9	328 41.1 9.8	27 13.0 2.9 54.7	60	17 24	18 06	18 54	03 05	04 36	05 51	06 37				
	18	86 52.7 S 7 51.9	343 09.9 9.8	N27 15.9 2.6 54.7	N 58	17 28	18 07	18 53	02 44	04 08	05 17	06 06				
	19	101 52.8 51.0	357 38.7 9.7	27 18.5 2.6 54.7	56	17 31	18 09	18 52	02 27	03 46	04 52	05 42				
	20	116 52.9 50.0	12 07.4 9.8	27 21.1 2.4 54.6	54	17 34	18 10	18 51	02 13	03 28	04 33	05 22				
	21	131 53.0 49.1	26 36.2 9.8	27 23.5 2.2 54.6	52	17 37	18 11	18 50	02 01	03 13	04 16	05 06				
	22	146 53.2 48.1	41 05.0 9.7	27 25.7 2.1 54.6	50	17 40	18 12	18 50	01 50	03 00	04 02	04 52				
	23	161 53.3 47.2	55 33.7 9.8	27 27.8 2.0 54.6	45	17 46	18 15	18 49	01 27	02 33	03 33	04 23				
WEDNESDAY	1 00	176 53.4 S 7 46.2	70 02.5 9.7	N27 29.8 1.9 54.6	N 40	17 50	18 18	18 49	01 08	02 12	03 10	04 01				
	01	191 53.5 45.3	84 31.2 9.8	27 31.7 1.7 54.5	35	17 54	18 20	18 49	00 53	01 54	02 51	03 42				
	02	206 53.6 44.3	99 00.0 9.8	27 33.4 1.6 54.5	30	17 58	18 22	18 50	00 40	01 39	02 35	03 26				
	03	221 53.7 43.4	113 28.8 9.7	27 35.0 1.4 54.5	20	18 05	18 27	18 52	00 17	01 13	02 08	02 59				
	04	236 53.9 42.4	127 57.5 9.8	27 36.4 1.3 54.5	N 10	18 10	18 31	18 56	24 51	00 51	01 44	02 36				
	05	251 54.0 41.5	142 26.3 9.8	27 37.7 1.2 54.5	0	18 16	18 37	19 01	24 31	00 31	01 22	02 14				
	06	266 54.1 S 7 40.5	156 55.1 9.8	N27 38.9 1.0 54.5	S 10	18 21	18 43	19 07	24 10	00 10	01 00	01 52				
	07	281 54.2 39.6	171 23.9 9.7	27 39.9 0.9 54.5	20	18 28	18 50	19 16	23 48	24 37	00 37	01 28				
	08	296 54.3 38.6	185 52.6 9.8	27 40.8 0.8 54.4	30	18 35	18 59	19 28	23 23	24 10	00 10	01 01				
	09	311 54.5 37.7	200 21.4 9.8	27 41.6 0.6 54.4	35	18 39	19 05	19 35	23 08	23 54	24 45	00 45				
	10	326 54.6 36.7	214 50.2 9.9	27 42.2 0.5 54.4	40	18 44	19 11	19 44	22 50	23 35	24 26	00 26				
	11	341 54.7 35.8	229 19.1 9.8	27 42.7 0.4 54.4	45	18 49	19 19	19 55	22 30	23 12	24 03	00 03				
	12	356 54.8 S 7 34.8	243 47.9 9.8	N27 43.1 0.2 54.4	S 50	18 56	19 29	20 10	22 04	22 43	23 34	24 34				
	13	11 54.9 33.9	258 16.7 9.9	27 43.3 0.1 54.4	52	18 59	19 34	20 17	21 51	22 29	23 19	24 20				
	14	26 55.1 32.9	272 45.6 9.8	27 43.4 0.1 54.4	54	19 02	19 39	20 25	21 37	22 13	23 02	24 05				
	15	41 55.2 32.0	287 14.4 9.9	27 43.3 0.2 54.3	56	19 06	19 45	20 34	21 20	21 53	22 42	23 47				
	16	56 55.3 31.0	301 43.3 9.9	27 43.1 0.3 54.3	58	19 10	19 52	20 45	21 00	21 29	22 17	23 24				
	17	71 55.4 30.1	316 12.2 9.9	27 42.8 0.5 54.3	S 60	19 15	19 59	20 57	20 34	20 56	21 42	22 55				
	18	86 55.5 S 7 29.1	330 41.1 9.9	N27 42.3 0.6 54.3	Day		SUN		MOON							
	19	101 55.7 28.2	345 10.0 10.0	27 41.7 0.7 54.3			Eqn. of Time	Mer.	Mer. Pass.		Age	Phase				
	20	116 55.8 27.2	359 39.0 9.9	27 41.0 0.9 54.3	00 ^h	12 ^h	Pass.	Upper	Lower	d	%					
	21	131 55.9 26.3	14 07.9 10.0	27 40.1 1.0 54.3	d	m s	m s	h m	h m	h m	%					
	22	146 56.0 25.3	28 36.9 10.0	27 39.1 1.1 54.3	27	12 48	12 43	12 13	18 18	05 53	07 52					
	23	161 56.2 24.4	43 05.9 10.1	N27 38.0 1.3 54.2	28	12 38	12 32	12 13	19 10	06 44	08 61					
		SD 16.2	d 0.9	SD 15.1	14.9	14.8	1	12 27	12 21	12 12	20 01	07 36	09 70			

UT	ARIES	VENUS −3.9	MARS +0.5	JUPITER −2.1	SATURN +0.8	STARS				
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
T H U R S D A Y	200 159 31.7	148 22.5 N 4 06.6	81 08.8 N25 24.8	147 58.4 N 3 45.6	187 36.7 S12 53.8	Acamar	315 13.1 S40 13.0			
	01 174 34.1	163 22.2 07.9	96 10.1 24.9	163 00.3 45.8	202 38.9 53.7	Achernar	335 21.7 S57 07.4			
	02 189 36.6	178 21.9 09.2	111 11.5 25.0	178 02.3 46.0	217 41.1 53.6	Acrux	173 01.2 S63 13.5			
	03 204 39.1	193 21.6 10.5	126 12.8 25.0	193 04.2 46.3	232 43.3 53.5	Adhara	255 06.9 S29 00.4			
	04 219 41.5	208 21.3 11.8	141 14.2 25.1	208 06.2 46.5	247 45.4 53.4	Aldebaran	290 41.4 N16 33.3			
	05 234 44.0	223 21.0 13.1	156 15.5 25.1	223 08.1 46.7	262 47.6 53.3					
	06 249 46.5	238 20.6 N 4 14.4	171 16.9 N25 25.2	238 10.1 N 3 46.9	277 49.8 S12 53.2	Alioth	166 13.8 N55 49.9			
	07 264 48.9	253 20.3 15.7	186 18.2 25.2	253 12.0 47.2	292 52.0 53.1	Alkaid	152 52.9 N49 11.6			
	08 279 51.4	268 20.0 17.0	201 19.6 25.3	268 14.0 47.4	307 54.1 53.0	Alnair	27 35.3 S46 51.0			
	09 294 53.8	283 19.7 18.3	216 20.9 25.3	283 15.9 47.6	322 56.3 52.9	Alnilam	275 39.2 S 1 11.3			
	10 309 56.3	298 19.4 19.6	231 22.3 25.4	298 17.8 47.8	337 58.5 52.8	Alphard	217 49.0 S 8 45.6			
	11 324 58.8	313 19.1 20.9	246 23.6 25.4	313 19.8 48.1	353 00.7 52.7					
	12 340 01.2	328 18.8 N 4 22.2	261 24.9 N25 25.5	328 21.7 N 3 48.3	8 02.8 S12 52.6	Alphecca	126 04.9 N26 38.0			
	13 355 03.7	343 18.5 23.5	276 26.3 25.5	343 23.7 48.5	23 05.0 52.5	Alpheratz	357 36.7 N29 13.0			
	14 10 06.2	358 18.1 24.8	291 27.6 25.6	358 25.6 48.7	38 07.2 52.4	Altair	62 01.7 N 8 55.6			
	15 25 08.6	13 17.8 26.1	306 29.0 25.6	13 27.6 48.9	53 09.4 52.3	Ankaa	353 09.0 S42 11.0			
	16 40 11.1	28 17.5 27.4	321 30.3 25.7	28 29.5 49.2	68 11.5 52.2	Antares	112 17.7 S26 29.0			
	17 55 13.6	43 17.2 28.6	336 31.7 25.7	43 31.5 49.4	83 13.7 52.1					
	18 70 16.0	58 16.9 N 4 29.9	351 33.0 N25 25.8	58 33.4 N 3 49.6	98 15.9 S12 52.0	Arcturus	145 49.1 N19 03.5			
	19 85 18.5	73 16.6 31.2	6 34.3 25.8	73 35.4 49.8	113 18.1 51.9	Atria	107 13.4 S69 03.9			
	20 100 21.0	88 16.3 32.5	21 35.7 25.9	88 37.3 50.1	128 20.3 51.8	Avior	234 14.9 S59 35.2			
	21 115 23.4	103 16.0 33.8	36 37.0 25.9	103 39.3 50.3	143 22.4 51.7	Bellatrix	278 24.5 N 6 22.2			
	22 130 25.9	118 15.6 35.1	51 38.4 26.0	118 41.2 50.5	158 24.6 51.6	Betelgeuse	270 53.6 N 7 24.6			
	23 145 28.3	133 15.3 36.4	66 39.7 26.0	133 43.1 50.7	173 26.8 51.5					
F R I D A Y	300 160 30.8	148 15.0 N 4 37.7	81 41.0 N25 26.1	148 45.1 N 3 51.0	188 29.0 S12 51.4	Canopus	263 52.9 S52 42.7			
	01 175 33.3	163 14.7 39.0	96 42.4 26.1	163 47.0 51.2	203 31.1 51.3	Capella	280 24.1 N46 01.4			
	02 190 35.7	178 14.4 40.3	111 43.7 26.2	178 49.0 51.4	218 33.3 51.2	Deneb	49 27.2 N45 21.5			
	03 205 38.2	193 14.1 41.6	126 45.1 26.2	193 50.9 51.6	233 35.5 51.1	Denebola	182 26.2 N14 26.5			
	04 220 40.7	208 13.8 42.9	141 46.4 26.3	208 52.9 51.9	248 37.7 51.0	Diphda	348 49.1 S17 51.8			
	05 235 43.1	223 13.5 44.2	156 47.7 26.3	223 54.8 52.1	263 39.8 50.9					
	06 250 45.6	238 13.1 N 4 45.4	171 49.1 N25 26.4	238 56.8 N 3 52.3	278 42.0 S12 50.8	Dubhe	193 42.2 N61 37.5			
	07 265 48.1	253 12.8 46.7	186 50.4 26.4	253 58.7 52.5	293 44.2 50.7	Elnath	278 03.7 N28 37.6			
	08 280 50.5	268 12.5 48.0	201 51.7 26.5	269 00.7 52.7	308 46.4 50.6	Eltanin	90 43.1 N51 28.8			
	09 295 53.0	283 12.2 49.3	216 53.1 26.5	284 02.6 53.0	323 48.6 50.5	Enif	33 40.6 N 9 58.7			
	10 310 55.5	298 11.9 50.6	231 54.4 26.6	299 04.5 53.2	338 50.7 50.4	Fomalhaut	15 16.6 S29 30.2			
	11 325 57.9	313 11.6 51.9	246 55.7 26.6	314 06.5 53.4	353 52.9 50.3					
	12 341 00.4	328 11.3 N 4 53.2	261 57.1 N25 26.7	329 08.4 N 3 53.6	8 55.1 S12 50.2	Gacrux	171 52.8 S57 14.5			
	13 356 02.8	343 10.9 54.5	276 58.4 26.7	344 10.4 53.9	23 57.3 50.1	Gienah	175 44.9 S17 40.3			
	14 11 05.3	358 10.6 55.8	291 59.7 26.8	359 12.3 54.1	38 59.4 50.0	Hadar	148 37.8 S60 28.9			
	15 26 07.8	13 10.3 57.1	307 01.1 26.8	14 14.3 54.3	54 01.6 49.9	Hamal	327 53.1 N23 34.3			
	16 41 10.2	28 10.0 58.3	322 02.4 26.9	29 16.2 54.5	69 03.8 49.8	Kaus Aust.	83 34.7 S34 22.4			
	17 56 12.7	43 09.7 4 59.6	337 03.7 26.9	44 18.2 54.8	84 06.0 49.7					
	18 71 15.2	58 09.4 N 5 00.9	352 05.1 N25 27.0	59 20.1 N 3 55.0	99 08.2 S12 49.6	Kochab	137 19.2 N74 03.3			
	19 86 17.6	73 09.1 02.2	7 06.4 27.0	74 22.0 55.2	114 10.3 49.5	Markab	13 31.7 N15 19.6			
	20 101 20.1	88 08.7 03.5	22 07.7 27.1	89 24.0 55.4	129 12.5 49.4	Menkar	314 07.9 N 4 10.7			
	21 116 22.6	103 08.4 04.8	37 09.1 27.1	104 25.9 55.7	144 14.7 49.3	Menkent	147 59.2 S36 28.9			
	22 131 25.0	118 08.1 06.1	52 10.4 27.2	119 27.9 55.9	159 16.9 49.2	Miaplacidus	221 37.8 S69 48.8			
	23 146 27.5	133 07.8 07.4	67 11.7 27.2	134 29.8 56.1	174 19.0 49.1					
S A T U R D A Y	400 161 29.9	148 07.5 N 5 08.6	82 13.0 N25 27.3	149 31.8 N 3 56.3	189 21.2 S12 49.0	Mirfak	308 30.6 N49 56.7			
	01 176 32.4	163 07.2 09.9	97 14.4 27.3	164 33.7 56.6	204 23.4 48.9	Nunki	75 49.8 S26 16.1			
	02 191 34.9	178 06.9 11.2	112 15.7 27.4	179 35.6 56.8	219 25.6 48.8	Peacock	53 08.6 S56 39.6			
	03 206 37.3	193 06.5 12.5	127 17.0 27.4	194 37.6 57.0	234 27.8 48.7	Pollux	243 18.9 N27 58.2			
	04 221 39.8	208 06.2 13.8	142 18.3 27.5	209 39.5 57.2	249 29.9 48.6	Procyon	244 52.2 N 5 09.9			
	05 236 42.3	223 05.9 15.1	157 19.7 27.5	224 41.5 57.5	264 32.1 48.5					
	06 251 44.7	238 05.6 N 5 16.4	172 21.0 N25 27.6	239 43.4 N 3 57.7	279 34.3 S12 48.4	Rasalhague	96 00.0 N12 32.4			
	07 266 47.2	253 05.3 17.7	187 22.3 27.6	254 45.4 57.9	294 36.5 48.3	Regulus	207 35.7 N11 51.2			
	08 281 49.7	268 05.0 18.9	202 23.6 27.6	269 47.3 58.1	309 38.6 48.2	Rigel	281 05.3 S 8 10.7			
	09 296 52.1	283 04.7 20.2	217 25.0 27.7	284 49.3 58.4	324 40.8 48.1	Rigel Kent.	139 42.1 S60 55.6			
	10 311 54.6	298 04.3 21.5	232 26.3 27.7	299 51.2 58.6	339 43.0 48.0	Sabik	102 04.6 S15 45.3			
	11 326 57.1	313 04.0 22.8	247 27.6 27.8	314 53.1 58.8	354 45.2 47.9					
	12 341 59.5	328 03.7 N 5 24.1	262 28.9 N25 27.8	329 55.1 N 3 59.0	9 47.4 S12 47.8	Schedar	349 33.3 N56 39.9			
	13 357 02.0	343 03.4 25.4	277 30.2 27.9	344 57.0 59.2	24 49.5 47.7	Shaula	96 12.5 S37 07.1			
	14 12 04.4	358 03.1 26.6	292 31.6 27.9	359 59.0 59.5	39 51.7 47.6	Sirius	258 27.4 S16 45.0			
	15 27 06.9	13 02.8 27.9	307 32.9 28.0	15 00.9 59.7	54 53.9 47.5	Spica	158 23.7 S11 17.0			
	16 42 09.4	28 02.4 29.2	322 34.2 28.0	30 02.8 3 59.9	69 56.1 47.4	Suhail	222 47.0 S43 31.7			
	17 57 11.8	43 02.1 30.5	337 35.5 28.1	45 04.8 4 00.1	84 58.2 47.3					
	18 72 14.3	58 01.8 N 5 31.8	352 36.8 N25 28.1	60 06.7 N 4 00.4	100 00.4 S12 47.2	Vega	80 34.4 N38 48.0			
	19 87 16.8	73 01.5 33.1	7 38.2 28.2	75 08.7 00.6	115 02.6 47.1	Zuben'ubi	136 57.6 S16 08.3			
	20 102 19.2	88 01.2 34.4	22 39.5 28.2	90 10.6 00.8	130 04.8 47.0					
	21 117 21.7	103 00.9 35.6	37 40.8 28.3	105 12.6 01.0	145 07.0 46.9					
	22 132 24.2	118 00.6 36.9	52 42.1 28.3	120 14.5 01.3	160 09.1 46.8					
	23 147 26.6	133 00.2 38.2	67 43.4 28.3	135 16.4 01.5	175 11.3 46.7					
h m								SHA	Mer.Pass.	
Mer.Pass. 13 15.8		v −0.3 d 1.3	v 1.3 d 0.0	v 1.9 d 0.2	v 2.2 d 0.1			° / ' / "	h m	
								Venus	347 44.2 14 07	
								Mars	281 10.2 18 32	
								Jupiter	348 14.3 14 03	
								Saturn	27 58.2 11 24	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	2	3	4	5	
	°	'		°	'							°						'
d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m
T H U R S D A Y	200	176	56.3	S 7 23.4	57	35.0	10.0	N27 36.7	1.4	54.2	N 72	05 01	06 19	07 28				
	01	191	56.4	22.5	72	04.0	10.1	27 35.3	1.5	54.2	68	05 07	06 18	07 19				12 25
	02	206	56.5	21.5	86	33.1	10.1	27 33.8	1.6	54.2	66	05 12	06 16	07 12				13 13
	03	221	56.7	20.6	101	02.2	10.1	27 32.2	1.8	54.2	64	05 16	06 15	07 06			11 33	13 44
	04	236	56.8	19.6	115	31.3	10.2	27 30.4	2.0	54.2	62	05 19	06 14	07 02		10 06	12 18	14 07
	05	251	56.9	18.7	130	00.5	10.2	27 28.4	2.2	54.2	60	05 22	06 13	06 57	09 28	11 07	12 48	14 25
	06	266	57.0	17.7	144	29.7	10.2	N27 26.4	2.2	54.2	58	05 24	06 12	06 54	10 20	11 41	13 10	14 39
	07	281	57.2	16.8	158	58.9	10.2	27 24.2	2.3	54.2	N 56	05 26	06 11	06 50	10 51	12 06	13 28	14 52
	08	296	57.3	15.8	173	28.1	10.3	27 21.9	2.5	54.2	54	05 27	06 10	06 47	11 15	12 25	13 43	15 03
	09	311	57.4	14.9	187	57.4	10.3	27 19.4	2.6	54.2	52	05 28	06 09	06 45	11 34	12 42	13 56	15 12
	10	326	57.5	13.9	202	26.7	10.4	27 16.8	2.7	54.1	50	05 29	06 08	06 42	11 50	12 56	14 07	15 21
	11	341	57.7	12.9	216	56.1	10.4	27 14.1	2.8	54.1	45	05 30	06 08	06 40	12 04	13 08	14 17	15 28
	12	356	57.8	12.0	231	25.5	10.4	N27 11.3	3.0	54.1	N 40	05 32	06 04	06 31	12 55	13 54	14 55	15 57
	13	11	57.9	11.0	245	54.9	10.4	27 08.3	3.1	54.1	35	05 33	06 02	06 27	13 13	14 10	15 09	16 08
	14	26	58.0	10.1	260	24.3	10.5	27 05.2	3.2	54.1	30	05 32	06 00	06 24	13 29	14 25	15 21	16 18
	15	41	58.2	09.1	274	53.8	10.5	27 02.0	3.4	54.1	20	05 31	05 56	06 19	13 56	14 49	15 42	16 35
	16	56	58.3	08.2	289	23.3	10.6	26 58.6	3.5	54.1	N 10	05 28	05 52	06 13	14 19	15 10	16 00	16 49
	17	71	58.4	07.2	303	52.9	10.6	26 55.1	3.6	54.1	0	05 24	05 48	06 09	14 40	15 30	16 17	17 02
	18	86	58.5	7 06.3	318	22.5	10.6	N26 51.5	3.7	54.1	S 10	05 18	05 43	06 04	15 02	15 49	16 34	17 16
	19	101	58.7	05.3	332	52.1	10.7	26 47.8	3.9	54.1	20	05 10	05 36	05 58	15 24	16 10	16 52	17 30
	20	116	58.8	04.4	347	21.8	10.7	26 43.9	4.0	54.1	30	04 59	05 28	05 52	15 51	16 34	17 12	17 46
	21	131	58.9	03.4	1 51.5	10.8	26 39.9	4.1	54.1	35	04 52	05 23	05 48	16 07	16 48	17 24	17 55	
	22	146	59.1	02.4	16 21.3	10.8	26 35.8	4.2	54.1	40	04 44	05 17	05 44	16 25	17 05	17 38	18 06	
	23	161	59.2	01.5	30 51.1	10.8	26 31.6	4.4	54.1	45	04 33	05 09	05 39	16 47	17 24	17 54	18 19	
F R I D A Y	300	176	59.3	S 7 00.5	45	20.9	10.9	N26 27.2	4.4	54.1	S 50	04 20	05 00	05 33	17 15	17 48	18 14	18 34
	01	191	59.4	6 59.6	59	50.8	11.0	26 22.8	4.6	54.1	52	04 13	04 56	05 31	17 28	18 00	18 23	18 41
	02	206	59.6	58.6	74	20.8	10.9	26 18.2	4.8	54.1	54	04 06	04 51	05 28	17 44	18 13	18 34	18 49
	03	221	59.7	57.7	88	50.7	11.1	26 13.4	4.8	54.0	56	03 57	04 45	05 24	18 02	18 29	18 46	18 57
	04	236	59.8	56.7	103	20.8	11.0	26 08.6	5.0	54.0	58	03 47	04 39	05 21	18 25	18 47	18 59	19 07
	05	252	00.0	55.7	117	50.8	11.2	26 03.6	5.1	54.0	S 60	03 36	04 32	05 17	18 54	19 09	19 15	19 18
	06	267	00.1	S 6 54.8	132	21.0	11.1	N25 58.5	5.2	54.0	Lat.	Sunset	Twilight		Moonset			
	07	282	00.2	53.8	146	51.1	11.2	25 53.3	5.3	54.0			Civil	Naut.	2	3	4	5
	08	297	00.4	52.9	161	21.3	11.3	25 48.0	5.5	54.0	°	h m	h m	h m	h m	h m	h m	h m
	09	312	00.5	51.9	175	51.6	11.3	25 42.5	5.5	54.0	N 72	16 58	18 07	19 26				
	10	327	00.6	51.0	190	21.9	11.4	25 37.0	5.7	54.0	N 70	17 06	18 08	19 19				09 35
	11	342	00.7	50.0	204	52.3	11.4	25 31.3	5.8	54.0	68	17 13	18 09	19 14				08 45
	12	357	00.9	S 6 49.0	219	22.7	11.5	N25 25.5	5.9	54.0	66	17 19	18 11	19 10			08 49	08 13
	13	12	01.0	48.1	233	53.2	11.5	25 19.6	6.1	54.0	64	17 24	18 12	19 07		08 36	08 03	07 50
	14	27	01.1	47.1	248	23.7	11.5	25 13.5	6.1	54.0	62	17 28	18 13	19 04	07 29	07 34	07 33	07 31
	15	42	01.3	46.2	262	54.2	11.7	25 07.4	6.3	54.0	60	17 32	18 13	19 02	06 37	07 00	07 10	07 15
	16	57	01.4	45.2	277	24.9	11.6	25 01.1	6.4	54.0	N 58	17 35	18 14	19 00	06 06	06 35	06 52	07 02
	17	72	01.5	44.2	291	55.5	11.8	24 54.7	6.4	54.0	56	17 38	18 15	18 58	05 42	06 15	06 36	06 50
	18	87	01.7	S 6 43.3	306	26.3	11.7	N24 48.3	6.6	54.0	54	17 40	18 16	18 57	05 22	05 58	06 23	06 40
	19	102	01.8	42.3	320	57.0	11.9	24 41.7	6.8	54.0	52	17 43	18 17	18 56	05 06	05 44	06 11	06 31
	20	117	01.9	41.4	335	27.9	11.8	24 34.9	6.8	54.0	50	17 45	18 17	18 55	04 52	05 31	06 01	06 23
	21	132	02.1	40.4	349	58.7	12.0	24 28.1	6.9	54.0	45	17 50	18 19	18 53	04 23	05 05	05 39	06 06
	22	147	02.2	39.4	4 29.7	12.0	24 21.2	7.0	54.0	N 40	17 54	18 21	18 52	04 01	04 45	05 21	05 52	
	23	162	02.3	38.5	19 00.7	12.0	24 14.2	7.2	54.0		35	17 57	18 22	18 52	03 42	04 27	05 06	05 39
S A T U R D A Y	400	177	02.5	S 6 37.5	33	31.7	12.1	N24 07.0	7.3	54.0	30	18 00	18 24	18 52	03 26	04 12	04 53	05 29
	01	192	02.6	36.6	48	02.8	12.2	23 59.7	7.3	54.0	20	18 06	18 28	18 53	02 59	03 47	04 31	05 10
	02	207	02.7	35.6	62	34.0	12.2	23 52.4	7.5	54.0	N 10	18 11	18 32	18 56	02 36	03 25	04 11	04 54
	03	222	02.9	34.6	77	05.2	12.3	23 44.9	7.6	54.0	0	18 15	18 36	19 00	02 14	03 04	03 53	04 39
	04	237	03.0	33.7	91	36.5	12.3	23 37.3	7.7	54.0	S 10	18 20	18 41	19 06	01 52	02 44	03 35	04 24
	05	252	03.1	32.7	106	07.8	12.4	23 29.6	7.8	54.0	20	18 25	18 48	19 13	01 28	02 22	03 15	04 08
	06	267	03.3	S 6 31.8	120	39.2	12.4	N23 21.8	7.8	54.0	30	18 31	18 56	19 24	01 01	01 56	02 52	03 49
	07	282	03.4	30.8	135	10.6	12.5	23 14.0	8.0	54.0	35	18 35	19 01	19 31	00 45	01 40	02 39	03 38
	08	297	03.5	29.8	149	42.1	12.5	23 06.0	8.1	54.0	40	18 39	19 06	19 39	00 26	01 23	02 23	03 25
	09	312	03.7	28.9	164	13.6	12.6	22 57.9	8.2	54.0	45	18 44	19 14	19 50	00 03	01 01	02 04	03 10
	10	327	03.8	27.9	178	45.2	12.7	22 49.7	8.3	54.1	S 50	18 49	19 23	20 03	24 34	00 34	01 41	02 51
	11	342	04.0	26.9	193	16.9	12.7	22 41.4	8.4	54.1	52	18 52	19 27	20 09	24 20	00 20	01 30	02 42
	12	357	04.1	S 6 26.0	207	48.6	12.8	N22 33.0	8.5	54.1	54	18 55	19 32	20 17	24 05	00 05	01 17	02 32
	13	12	04.2	25.0	222	20.4	12.8	22 24.5	8.6	54.1	56	18 58	19 37	20 25	23 47	25 02	01 02	02 21
	14	27	04.4	24.1	236	52.2	12.9	22 15.9	8.7	54.1	58	19 02	19 43	20 34	23 24	24 44	00 44	02 08
	15	42	04.5	23.1	251	24.1	12.9	22 07.2	8.8	54.1	S 60	19 06	19 50	20 46	22 55	24 23	00 23	01 53
	16	57	04.6	22.1	265	56.0	13.0	21 58.4	8.9	54.1	SUN			MOON				
	17	72	04.8	21.2	280													

UT	ARIES		VENUS −4.0		MARS +0.5		JUPITER −2.1		SATURN +0.8		STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
SUNDAY	5 00	162 29.1	147 59.9	N 5 39.5	82 44.7	N25 28.4	150 18.4	N 4 01.7	190 13.5	S12 46.6	Acamar	315 13.1	S40 13.0
	01	177 31.6	162 59.6	40.8	97 46.0	28.4	165 20.3	01.9	205 15.7	46.5	Achernar	335 21.7	S57 07.4
	02	192 34.0	177 59.3	42.0	112 47.4	28.5	180 22.3	02.2	220 17.9	46.4	Acrux	173 01.1	S63 13.5
	03	207 36.5	192 59.0	43.3	127 48.7	28.5	195 24.2	02.4	235 20.0	46.3	Adhara	255 06.9	S29 00.4
	04	222 38.9	207 58.7	44.6	142 50.0	28.6	210 26.1	02.6	250 22.2	46.2	Aldebaran	290 41.4	N16 33.3
	05	237 41.4	222 58.3	45.9	157 51.3	28.6	225 28.1	02.8	265 24.4	46.1			
	06	252 43.9	237 58.0	N 5 47.2	172 52.6	N25 28.7	240 30.0	N 4 03.1	280 26.6	S12 46.0	Alioth	166 13.8	N55 49.9
	07	267 46.3	252 57.7	48.5	187 53.9	28.7	255 32.0	03.3	295 28.7	45.9	Alkaid	152 52.8	N49 11.6
	08	282 48.8	267 57.4	49.7	202 55.2	28.7	270 33.9	03.5	310 30.9	45.8	Alnair	27 35.3	S46 51.0
	09	297 51.3	282 57.1	51.0	217 56.5	28.8	285 35.9	03.7	325 33.1	45.7	Alnilam	275 39.2	S 1 11.3
	10	312 53.7	297 56.8	52.3	232 57.9	28.8	300 37.8	04.0	340 35.3	45.6	Alphard	217 49.0	S 8 45.6
	11	327 56.2	312 56.4	53.6	247 59.2	28.9	315 39.7	04.2	355 37.5	45.5			
	12	342 58.7	327 56.1	N 5 54.9	263 00.5	N25 28.9	330 41.7	N 4 04.4	10 39.6	S12 45.4	Alphecca	126 04.9	N26 38.0
	13	358 01.1	342 55.8	56.1	278 01.8	29.0	345 43.6	04.6	25 41.8	45.3	Alpheratz	357 36.7	N29 13.0
	14	13 03.6	357 55.5	57.4	293 03.1	29.0	0 45.6	04.9	40 44.0	45.2	Altair	62 01.7	N 8 55.6
	15	28 06.0	12 55.2	5 58.7	308 04.4	29.1	15 47.5	05.1	55 46.2	45.1	Ankaa	353 09.0	S42 11.0
	16	43 08.5	27 54.8	6 00.0	323 05.7	29.1	30 49.4	05.3	70 48.4	45.0	Antares	112 17.7	S26 29.0
	17	58 11.0	42 54.5	01.3	338 07.0	29.1	45 51.4	05.5	85 50.5	44.9			
	18	73 13.4	57 54.2	N 6 02.5	353 08.3	N25 29.2	60 53.3	N 4 05.8	100 52.7	S12 44.8	Arcturus	145 49.1	N19 03.5
	19	88 15.9	72 53.9	03.8	8 09.6	29.2	75 55.3	06.0	115 54.9	44.7	Atria	107 13.3	S69 03.9
	20	103 18.4	87 53.6	05.1	23 10.9	29.3	90 57.2	06.2	130 57.1	44.6	Avior	234 14.9	S59 35.2
	21	118 20.8	102 53.3	06.4	38 12.2	29.3	105 59.1	06.4	145 59.3	44.5	Bellatrix	278 24.5	N 6 22.2
	22	133 23.3	117 52.9	07.6	53 13.5	29.4	121 01.1	06.7	161 01.4	44.4	Beteigeuse	270 53.7	N 7 24.6
	23	148 25.8	132 52.6	08.9	68 14.8	29.4	136 03.0	06.9	176 03.6	44.3			
	MONDAY	6 00	163 28.2	147 52.3	N 6 10.2	83 16.2	N25 29.5	151 05.0	N 4 07.1	191 05.8	S12 44.2	Canopus	263 52.9
01		178 30.7	162 52.0	11.5	98 17.5	29.5	166 06.9	07.3	206 08.0	44.1	Capella	280 24.1	N46 01.4
02		193 33.2	177 51.7	12.8	113 18.8	29.5	181 08.8	07.6	221 10.2	44.0	Deneb	49 27.2	N45 21.5
03		208 35.6	192 51.3	14.0	128 20.1	29.6	196 10.8	07.8	236 12.3	43.9	Denebola	182 26.2	N14 26.5
04		223 38.1	207 51.0	15.3	143 21.4	29.6	211 12.7	08.0	251 14.5	43.8	Diphda	348 49.1	S17 51.8
05		238 40.5	222 50.7	16.6	158 22.7	29.7	226 14.6	08.2	266 16.7	43.7			
06		253 43.0	237 50.4	N 6 17.9	173 24.0	N25 29.7	241 16.6	N 4 08.5	281 18.9	S12 43.6	Dubhe	193 42.2	N61 37.5
07		268 45.5	252 50.1	19.1	188 25.3	29.8	256 18.5	08.7	296 21.0	43.5	Elnath	278 03.7	N28 37.6
08		283 47.9	267 49.7	20.4	203 26.6	29.8	271 20.5	08.9	311 23.2	43.4	Eltanin	90 43.0	N51 28.8
09		298 50.4	282 49.4	21.7	218 27.9	29.8	286 22.4	09.1	326 25.4	43.3	Enif	33 40.6	N 9 58.7
10		313 52.9	297 49.1	23.0	233 29.2	29.9	301 24.3	09.4	341 27.6	43.1	Fomalhaut	15 16.5	S29 30.1
11		328 55.3	312 48.8	24.2	248 30.5	29.9	316 26.3	09.6	356 29.8	43.0			
12		343 57.8	327 48.5	N 6 25.5	263 31.8	N25 30.0	331 28.2	N 4 09.8	11 31.9	S12 42.9	Gacrux	171 52.8	S57 14.5
13		359 00.3	342 48.2	26.8	278 33.1	30.0	346 30.2	10.0	26 34.1	42.8	Gienah	175 44.9	S17 40.3
14		14 02.7	357 47.8	28.1	293 34.4	30.0	1 32.1	10.3	41 36.3	42.7	Hadar	148 37.8	S60 28.9
15		29 05.2	12 47.5	29.3	308 35.6	30.1	16 34.0	10.5	56 38.5	42.6	Hamal	327 53.2	N23 34.2
16		44 07.7	27 47.2	30.6	323 36.9	30.1	31 36.0	10.7	71 40.7	42.5	Kaus Aust.	83 34.7	S34 22.4
17		59 10.1	42 46.9	31.9	338 38.2	30.2	46 37.9	11.0	86 42.8	42.4			
18		74 12.6	57 46.5	N 6 33.2	353 39.5	N25 30.2	61 39.8	N 4 11.2	101 45.0	S12 42.3	Kochab	137 19.1	N74 03.3
19		89 15.0	72 46.2	34.4	8 40.8	30.2	76 41.8	11.4	116 47.2	42.2	Markab	13 31.7	N15 19.6
20		104 17.5	87 45.9	35.7	23 42.1	30.3	91 43.7	11.6	131 49.4	42.1	Menkar	314 07.9	N 4 10.7
21		119 20.0	102 45.6	37.0	38 43.4	30.3	106 45.7	11.9	146 51.6	42.0	Menkent	147 59.2	S36 29.0
22		134 22.4	117 45.3	38.2	53 44.7	30.4	121 47.6	12.1	161 53.7	41.9	Miaplacidus	221 37.8	S69 48.8
23		149 24.9	132 44.9	39.5	68 46.0	30.4	136 49.5	12.3	176 55.9	41.8			
TUESDAY	7 00	164 27.4	147 44.6	N 6 40.8	83 47.3	N25 30.5	151 51.5	N 4 12.5	191 58.1	S12 41.7	Mirfak	308 30.6	N49 56.7
	01	179 29.8	162 44.3	42.1	98 48.6	30.5	166 53.4	12.8	207 00.3	41.6	Nunki	75 49.8	S26 16.1
	02	194 32.3	177 44.0	43.3	113 49.9	30.5	181 55.4	13.0	222 02.5	41.5	Peacock	53 08.6	S56 39.6
	03	209 34.8	192 43.7	44.6	128 51.2	30.6	196 57.3	13.2	237 04.6	41.4	Pollux	243 18.9	N27 58.2
	04	224 37.2	207 43.3	45.9	143 52.5	30.6	211 59.2	13.4	252 06.8	41.3	Procyon	244 52.2	N 5 09.9
	05	239 39.7	222 43.0	47.1	158 53.7	30.7	227 01.2	13.7	267 09.0	41.2			
	06	254 42.1	237 42.7	N 6 48.4	173 55.0	N25 30.7	242 03.1	N 4 13.9	282 11.2	S12 41.1	Rasalhague	96 00.0	N12 32.4
	07	269 44.6	252 42.4	49.7	188 56.3	30.7	257 05.0	14.1	297 13.4	41.0	Regulus	207 35.7	N11 51.2
	08	284 47.1	267 42.1	50.9	203 57.6	30.8	272 07.0	14.3	312 15.6	40.9	Rigel	281 05.3	S 8 10.6
	09	299 49.5	282 41.7	52.2	218 58.9	30.8	287 08.9	14.6	327 17.7	40.8	Rigel Kent.	139 42.0	S60 55.6
	10	314 52.0	297 41.4	53.5	234 00.2	30.8	302 10.8	14.8	342 19.9	40.7	Sabik	102 04.6	S15 45.3
	11	329 54.5	312 41.1	54.8	249 01.5	30.9	317 12.8	15.0	357 22.1	40.6			
	12	344 56.9	327 40.8	N 6 56.0	264 02.8	N25 30.9	332 14.7	N 4 15.2	12 24.3	S12 40.5	Schedar	349 33.3	N56 39.9
	13	359 59.4	342 40.4	57.3	279 04.0	31.0	347 16.7	15.5	27 26.5	40.4	Shaula	96 12.5	S37 07.1
	14	15 01.9	357 40.1	58.6	294 05.3	31.0	2 18.6	15.7	42 28.6	40.3	Sirius	258 27.4	S16 45.0
	15	30 04.3	12 39.8	6 59.8	309 06.6	31.0	17 20.5	15.9	57 30.8	40.2	Spica	158 23.7	S11 17.0
	16	45 06.8	27 39.5	7 01.1	324 07.9	31.1	32 22.5	16.1	72 33.0	40.1	Suhail	222 47.1	S43 31.7
	17	60 09.3	42 39.1	02.4	339 09.2	31.1	47 24.4	16.4	87 35.2	40.0			
	18	75 11.7	57 38.8	N 7 03.6	354 10.5	N25 31.2	62 26.3	N 4 16.6	102 37.4	S12 39.9	Vega	80 34.4	N38 48.0
	19	90 14.2	72 38.5	04.9	9 11.8	31.2	77 28.3	16.8	117 39.5	39.8	Zuben'ubi	136 57.5	S16 08.3
	20	105 16.6	87 38.2	06.2	24 13.0	31.2	92 30.2	17.0	132 41.7	39.7			
	21	120 19.1	102 37.9	07.4	39 14.3	31.3	107 32.1	17.3	147 43.9	39.6			
	22	135 21.6	117 37.5	08.7	54 15.6	31.3	122 34.1	17.5	162 46.1	39.5	Venus	344 24.1	h 14 09
	23	150 24.0	132 37.2	10.0	69 16.9	31.3	137 36.0	17.7	177 48.3	39.4	Mars	279 47.9	h 18 25
											Jupiter	347 36.7	h 13 54
											Saturn	27 37.6	h 11 14
											Mer. Pass.		
											SHA		
											Mer. Pass.		
											SHA		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise						
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	5		6	7	8				
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m			
SUNDAY	5 00	177 05.7 S 6 14.4	22 13.5 13.4	N20	44.6 9.6	54.1		N 72	04 46	06 05	07 12		14 29	16 45	18 47				
	01	192 05.9 13.5	36 45.9 13.5	20	35.0 9.8	54.1		N 70	04 54	06 04	07 05	12 25	14 56	16 57	18 50				
	02	207 06.0 12.5	51 18.4 13.5	20	25.2 9.8	54.1		68	05 00	06 04	07 00	13 13	15 17	17 07	18 52				
	03	222 06.2 . 11.5	65 50.9 13.6	20	15.4 9.9	54.1		66	05 05	06 04	06 55	13 44	15 33	17 15	18 53				
	04	237 06.3 10.6	80 23.5 13.7	20	05.5 10.0	54.1		64	05 09	06 04	06 51	14 07	15 46	17 21	18 55				
	05	252 06.4 09.6	94 56.2 13.7	19	55.5 10.0	54.1		62	05 12	06 04	06 48	14 25	15 57	17 27	18 56				
	06	267 06.6 S 6 08.6	109 28.9 13.7	N19	45.5 10.2	54.2		60	05 15	06 03	06 45	14 39	16 07	17 32	18 57				
	07	282 06.7 07.7	124 01.6 13.9	19	35.3 10.2	54.2		N 58	05 18	06 03	06 42	14 52	16 15	17 36	18 58				
	08	297 06.9 06.7	138 34.5 13.8	19	25.1 10.4	54.2		56	05 20	06 03	06 40	15 03	16 22	17 40	18 58				
	09	312 07.0 . 05.7	153 07.3 13.9	19	14.7 10.4	54.2		54	05 21	06 02	06 37	15 12	16 28	17 44	18 59				
	10	327 07.1 04.8	167 40.2 14.0	19	04.3 10.5	54.2		52	05 23	06 02	06 35	15 21	16 34	17 47	19 00				
	11	342 07.3 03.8	182 13.2 14.0	18	53.8 10.6	54.2		50	05 24	06 01	06 34	15 28	16 39	17 50	19 00				
	12	357 07.4 S 6 02.8	196 46.2 14.1	N18	43.2 10.6	54.2		45	05 26	06 00	06 30	15 44	16 50	17 56	19 02				
	13	12 07.6 01.9	211 19.3 14.1	18	32.6 10.7	54.2		N 40	05 28	05 59	06 26	15 57	16 59	18 01	19 03				
	14	27 07.7 00.9	225 52.4 14.2	18	21.9 10.9	54.2		35	05 29	05 58	06 23	16 08	17 07	18 05	19 04				
	15	42 07.8 6 00.0	240 25.6 14.2	18	11.0 10.8	54.2		30	05 29	05 57	06 21	16 18	17 14	18 09	19 04				
	16	57 08.0 5 59.0	254 58.8 14.3	18	00.2 11.0	54.2		20	05 29	05 54	06 16	16 35	17 26	18 16	19 06				
	17	72 08.1 58.0	269 32.1 14.3	17	49.2 11.1	54.2		N 10	05 27	05 51	06 12	16 49	17 36	18 22	19 07				
	18	87 08.3 S 5 57.1	284 05.4 14.3	N17	38.1 11.1	54.3		0	05 23	05 47	06 08	17 02	17 45	18 27	19 08				
	19	102 08.4 56.1	298 38.7 14.5	17	27.0 11.2	54.3		S 10	05 18	05 43	06 04	17 16	17 55	18 33	19 09				
	20	117 08.5 55.1	313 12.2 14.4	17	15.8 11.3	54.3		20	05 11	05 37	05 59	17 30	18 05	18 38	19 11				
	21	132 08.7 . 54.2	327 45.6 14.5	17	04.5 11.3	54.3		30	05 02	05 30	05 54	17 46	18 17	18 45	19 12				
	22	147 08.8 53.2	342 19.1 14.6	16	53.2 11.4	54.3		35	04 55	05 25	05 51	17 55	18 23	18 49	19 13				
	23	162 09.0 52.2	356 52.7 14.6	16	41.8 11.5	54.3		40	04 48	05 20	05 48	18 06	18 31	18 53	19 14				
	MONDAY	6 00	177 09.1 S 5 51.2	11 26.3 14.6	N16	30.3 11.6	54.3		45	04 38	05 14	05 43	18 19	18 39	18 58	19 15			
01		192 09.3 50.3	25 59.9 14.7	16	18.7 11.6	54.3		S 50	04 25	05 05	05 38	18 34	18 50	19 04	19 16				
02		207 09.4 49.3	40 33.6 14.8	16	07.1 11.7	54.3		52	04 19	05 02	05 36	18 41	18 55	19 06	19 17				
03		222 09.5 . 48.3	55 07.4 14.7	15	55.4 11.8	54.3		54	04 13	04 57	05 34	18 49	19 00	19 09	19 18				
04		237 09.7 47.4	69 41.1 14.9	15	43.6 11.8	54.3		56	04 05	04 52	05 31	18 57	19 06	19 12	19 18				
05		252 09.8 46.4	84 15.0 14.8	15	31.8 11.9	54.4		58	03 56	04 47	05 28	19 07	19 12	19 16	19 19				
06		267 10.0 S 5 45.4	98 48.8 14.9	N15	19.9 12.0	54.4		S 60	03 46	04 41	05 24	19 18	19 20	19 20	19 20				
07		282 10.1 44.5	113 22.7 15.0	15	07.9 12.0	54.4		Lat.		Sunset		Twilight		Moonset					
08		297 10.3 43.5	127 56.7 15.0	14	55.9 12.1	54.4						Civil		Naut.		5	6	7	8
09		312 10.4 . 42.5	142 30.7 15.0	14	43.8 12.2	54.4													
10		327 10.6 41.6	157 04.7 15.1	14	31.6 12.2	54.4													
11		342 10.7 40.6	171 38.8 15.1	14	19.4 12.3	54.4		N 72	h m	h m	h m	h m	h m	h m	h m	h m	h m		
12		357 10.8 S 5 39.6	186 12.9 15.1	N14	07.1 12.4	54.4		N 70	17 13	18 20	19 40		09 04	08 16	07 42				
13		12 11.0 38.7	200 47.0 15.2	13	54.7 12.4	54.4		68	17 19	18 20	19 32	09 35	08 34	08 01	07 36				
14		27 11.1 37.7	215 21.2 15.2	13	42.3 12.4	54.5		66	17 24	18 20	19 25	08 45	08 12	07 50	07 31				
15		42 11.3 . 36.7	229 55.4 15.3	13	29.9 12.6	54.5		64	17 29	18 20	19 20	08 13	07 54	07 40	07 27				
16		57 11.4 35.8	244 29.7 15.3	13	17.3 12.5	54.5		62	17 33	18 20	19 16	07 50	07 40	07 32	07 24				
17		72 11.6 34.8	259 04.0 15.3	13	04.8 12.7	54.5		60	17 36	18 21	19 12	07 31	07 28	07 24	07 21				
18		87 11.7 S 5 33.8	273 38.3 15.4	N12	52.1 12.7	54.5		58	17 39	18 21	19 09	07 15	07 17	07 18	07 18				
19		102 11.9 32.8	288 12.7 15.4	12	39.4 12.7	54.5		N 58	17 42	18 21	19 06	07 02	07 08	07 13	07 16				
20		117 12.0 31.9	302 47.1 15.4	12	26.7 12.9	54.5		56	17 44	18 21	19 04	06 50	07 00	07 08	07 14				
21		132 12.2 . 30.9	317 21.5 15.5	12	13.8 12.8	54.5		54	17 46	18 21	19 02	06 40	06 53	07 03	07 12				
22		147 12.3 29.9	331 56.0 15.5	12	01.0 12.9	54.6		52	17 48	18 22	19 01	06 31	06 47	06 59	07 10				
23		162 12.5 29.0	346 30.5 15.5	11	48.1 13.0	54.6		50	17 50	18 22	19 00	06 23	06 41	06 56	07 09				
TUESDAY		7 00	177 12.6 S 5 28.0	1 05.0 15.5	N11	35.1 13.0	54.6		45	17 54	18 23	18 57	06 06	06 28	06 48	07 05			
	01	192 12.8 27.0	15 39.5 15.6	11	22.1 13.1	54.6		N 40	17 57	18 24	18 55	05 52	06 18	06 41	07 02				
	02	207 12.9 26.1	30 14.1 15.6	11	09.0 13.1	54.6		35	18 00	18 25	18 54	05 39	06 09	06 35	07 00				
	03	222 13.0 . 25.1	44 48.7 15.7	10	55.9 13.2	54.6		30	18 02	18 26	18 54	05 29	06 01	06 30	06 58				
	04	237 13.2 24.1	59 23.4 15.6	10	42.7 13.2	54.6		20	18 07	18 29	18 54	05 10	05 47	06 21	06 54				
	05	252 13.3 23.1	73 58.0 15.7	10	29.5 13.3	54.7		N 10	18 11	18 32	18 56	04 54	05 35	06 13	06 50				
	06	267 13.5 S 5 22.2	88 32.7 15.7	N10	16.2 13.3	54.7		0	18 15	18 35	18 59	04 39	05 23	06 06	06 47				
	07	282 13.6 21.2	103 07.4 15.7	10	02.9 13.3	54.7		S 10	18 19	18 40	19 04	04 24	05 12	05 58	06 43				
	08	297 13.8 20.2	117 42.1 15.8	9	49.6 13.4	54.7		20	18 23	18 45	19 11	04 08	04 59	05 50	06 40				
	09	312 13.9 . 19.3	132 16.9 15.8	9	36.2 13.5	54.7		30	18 28	18 52	19 20	03 49	04 45	05 41	06 36				
	10	327 14.1 18.3	146 51.7 15.8	9	22.7 13.5	54.7		35	18 31	18 56	19 27	03 38	04 37	05 35	06 33				
	11	342 14.2 17.3	161 26.5 15.8	9	09.2 13.5	54.7		40	18 34	19 02	19 34	03 25	04 27	05 29	06 31				
	12	357 14.4 S 5 16.3	176 01.3 15.9	N 8	55.7 13.6	54.7		45	18 38	19 08	19 44	03 10	04 16	05 22	06 27				
	13	12 14.5 15.4	190 36.2 15.8	8	42.1 13.6	54.8		S 50	18 43	19 16	19 56	02 51	04 02	05 13	06 24				
	14	27 14.7 14.4	205 11.0 15.9	8	28.5 13.7	54.8		52	18 45	19 20	20 02	02 42	03 56	05 09	06 22				
	15	42 14.8 . 13.4	219 45.9 15.9	8	14.8 13.6	54.8		54	18 48	19 24	20 08	02 32	03 49	05 05	06 20				
	16	57 15.0 12.4	234 20.8 15.9	8	01.2 13.8	54.8		56	18 50	19 29	20 16	02 21	03 41	05 00	06 18				
	17	72 15.1 11.5	248 55.7 15.9	7	47.4 13.7	54.8		58	18 53	19 34	20 24	02 08	03 32	04 54	06 15				
	18	87 15.3 S 5 10.5	263 30.6 16.0	N 7	33.7 13.8	54.8		S 60	18 57	19 40	20 34	01 53	03 21	04 48	06 13				
	19	102 15.4 09.5	278 05.6 16.0	7	19.9 13.9	54.9		SUN		MOON		Mer. Pass.		Age		Phase			
	20	117 15.6 08.6	292 40.6 15.9	7	06.0 13.9	54.9		Day	Eqn. of Time		Mer.	Mer. Pass.							
	21	132 15.7 . 07.6	307 15.5 16.0	6	52.1 13.9	54.9			00 ^h	12 ^h	Pass.	Upper	Lower						
	22	147 15.9 06.6	321 50.5 16.0	6	38.2														

UT	ARIES	VENUS -4.0			MARS +0.6		JUPITER -2.1		SATURN +0.8		STARS		
	GHA ° / ' / "	GHA ° / ' / "	Dec ° / ' / "		GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	Name	SHA ° / ' / "	Dec ° / ' / "
WEDNESDAY	8 00	165 26.5	147 36.9 N	7 11.2	84 18.2 N25	31.4	152 38.0 N	4 18.0	192 50.4 S12	39.3	Acamar	315 13.1 S40	13.0
	01	180 29.0	162 36.6	12.5	99 19.4	31.4	167 39.9	18.2	207 52.6	39.2	Achernar	335 21.8 S57	07.4
	02	195 31.4	177 36.2	13.7	114 20.7	31.5	182 41.8	18.4	222 54.8	39.1	Acrux	173 01.1 S63	13.6
	03	210 33.9	192 35.9	15.0	129 22.0	31.5	197 43.8	18.6	237 57.0	39.0	Adhara	255 06.9 S29	00.4
	04	225 36.4	207 35.6	16.3	144 23.3	31.5	212 45.7	18.9	252 59.2	38.9	Aldebaran	290 41.4 N16	33.3
	05	240 38.8	222 35.3	17.5	159 24.6	31.6	227 47.6	19.1	268 01.3	38.8			
	06	255 41.3	237 34.9 N	7 18.8	174 25.8 N25	31.6	242 49.6 N	4 19.3	283 03.5 S12	38.7	Alioth	166 13.8 N55	49.9
	07	270 43.7	252 34.6	20.1	189 27.1	31.6	257 51.5	19.5	298 05.7	38.6	Alkaid	152 52.8 N49	11.6
	08	285 46.2	267 34.3	21.3	204 28.4	31.7	272 53.4	19.8	313 07.9	38.5	Alnair	27 35.3 S46	51.0
	09	300 48.7	282 34.0	22.6	219 29.7	31.7	287 55.4	20.0	328 10.1	38.4	Alnilam	275 39.2 S 1	11.3
	10	315 51.1	297 33.6	23.9	234 31.0	31.8	302 57.3	20.2	343 12.3	38.3	Alphard	217 49.0 S 8	45.6
	11	330 53.6	312 33.3	25.1	249 32.2	31.8	317 59.2	20.4	358 14.4	38.2			
	12	345 56.1	327 33.0 N	7 26.4	264 33.5 N25	31.8	333 01.2 N	4 20.7	13 16.6 S12	38.1	Alphecca	126 04.9 N26	38.0
	13	0 58.5	342 32.7	27.6	279 34.8	31.9	348 03.1	20.9	28 18.8	38.0	Alpheratz	357 36.7 N29	13.0
	14	16 01.0	357 32.3	28.9	294 36.1	31.9	3 05.0	21.1	43 21.0	37.9	Altair	62 01.6 N 8	55.5
	15	31 03.5	12 32.0	30.2	309 37.3	31.9	18 07.0	21.3	58 23.2	37.8	Ankaa	353 09.0 S42	11.0
	16	46 05.9	27 31.7	31.4	324 38.6	32.0	33 08.9	21.6	73 25.3	37.7	Antares	112 17.7 S26	29.0
	17	61 08.4	42 31.3	32.7	339 39.9	32.0	48 10.8	21.8	88 27.5	37.6			
	18	76 10.9	57 31.0 N	7 33.9	354 41.2 N25	32.0	63 12.8 N	4 22.0	103 29.7 S12	37.5	Arcturus	145 49.1 N19	03.5
	19	91 13.3	72 30.7	35.2	9 42.4	32.1	78 14.7	22.3	118 31.9	37.4	Atria	107 13.2 S69	03.9
	20	106 15.8	87 30.4	36.5	24 43.7	32.1	93 16.7	22.5	133 34.1	37.3	Avior	234 14.9 S59	35.2
	21	121 18.2	102 30.0	37.7	39 45.0	32.1	108 18.6	22.7	148 36.3	37.2	Bellatrix	278 24.5 N 6	22.2
	22	136 20.7	117 29.7	39.0	54 46.2	32.2	123 20.5	22.9	163 38.4	37.1	Betelgeuse	270 53.7 N 7	24.6
	23	151 23.2	132 29.4	40.2	69 47.5	32.2	138 22.5	23.2	178 40.6	37.0			
THURSDAY	9 00	166 25.6	147 29.1 N	7 41.5	84 48.8 N25	32.2	153 24.4 N	4 23.4	193 42.8 S12	36.9	Canopus	263 52.9 S52	42.7
	01	181 28.1	162 28.7	42.8	99 50.1	32.3	168 26.3	23.6	208 45.0	36.8	Capella	280 24.1 N46	01.4
	02	196 30.6	177 28.4	44.0	114 51.3	32.3	183 28.3	23.8	223 47.2	36.7	Deneb	49 27.2 N45	21.5
	03	211 33.0	192 28.1	45.3	129 52.6	32.4	198 30.2	24.1	238 49.3	36.6	Denebola	182 26.2 N14	26.5
	04	226 35.5	207 27.7	46.5	144 53.9	32.4	213 32.1	24.3	253 51.5	36.5	Diphda	348 49.1 S17	51.8
	05	241 38.0	222 27.4	47.8	159 55.1	32.4	228 34.1	24.5	268 53.7	36.4			
	06	256 40.4	237 27.1 N	7 49.0	174 56.4 N25	32.5	243 36.0 N	4 24.7	283 55.9 S12	36.3	Dubhe	193 42.2 N61	37.6
	07	271 42.9	252 26.8	50.3	189 57.7	32.5	258 37.9	25.0	298 58.1	36.2	Elnath	278 03.8 N28	37.6
	08	286 45.3	267 26.4	51.6	204 58.9	32.5	273 39.9	25.2	314 00.3	36.1	Eltanin	90 43.0 N51	28.8
	09	301 47.8	282 26.1	52.8	220 00.2	32.6	288 41.8	25.4	329 02.4	36.1	Enif	33 40.6 N 9	58.7
	10	316 50.3	297 25.8	54.1	235 01.5	32.6	303 43.7	25.6	344 04.6	36.0	Fomalhaut	15 16.5 S29	30.1
	11	331 52.7	312 25.4	55.3	250 02.7	32.6	318 45.7	25.9	359 06.8	35.9			
	12	346 55.2	327 25.1 N	7 56.6	265 04.0 N25	32.7	333 47.6 N	4 26.1	14 09.0 S12	35.8	Gacrux	171 52.8 S57	14.5
	13	1 57.7	342 24.8	57.8	280 05.3	32.7	348 49.5	26.3	29 11.2	35.7	Gienah	175 44.8 S17	40.3
	14	17 00.1	357 24.5	7 59.1	295 06.5	32.7	3 51.5	26.6	44 13.4	35.6	Hadar	148 37.7 S60	28.9
	15	32 02.6	12 24.1	8 00.3	310 07.8	32.8	18 53.4	26.8	59 15.5	35.5	Hamal	327 53.2 N23	34.2
	16	47 05.1	27 23.8	01.6	325 09.0	32.8	33 55.3	27.0	74 17.7	35.4	Kaus Aust.	83 34.7 S34	22.4
	17	62 07.5	42 23.5	02.8	340 10.3	32.8	48 57.3	27.2	89 19.9	35.3			
	18	77 10.0	57 23.1 N	8 04.1	355 11.6 N25	32.9	63 59.2 N	4 27.5	104 22.1 S12	35.2	Kochab	137 19.1 N74	03.3
	19	92 12.5	72 22.8	05.3	10 12.8	32.9	79 01.1	27.7	119 24.3	35.1	Markab	13 31.7 N15	19.6
	20	107 14.9	87 22.5	06.6	25 14.1	32.9	94 03.0	27.9	134 26.5	35.0	Menkar	314 07.9 N 4	10.7
	21	122 17.4	102 22.1	07.9	40 15.4	32.9	109 05.0	28.1	149 28.6	34.9	Menkent	147 59.2 S36	29.0
	22	137 19.8	117 21.8	09.1	55 16.6	33.0	124 06.9	28.4	164 30.8	34.8	Miaplacidus	221 37.8 S69	48.8
	23	152 22.3	132 21.5	10.4	70 17.9	33.0	139 08.8	28.6	179 33.0	34.7			
FRIDAY	10 00	167 24.8	147 21.1 N	8 11.6	85 19.1 N25	33.0	154 10.8 N	4 28.8	194 35.2 S12	34.6	Mirfak	308 30.7 N49	56.7
	01	182 27.2	162 20.8	12.9	100 20.4	33.1	169 12.7	29.1	209 37.4	34.5	Nunki	75 49.8 S26	16.1
	02	197 29.7	177 20.5	14.1	115 21.7	33.1	184 14.6	29.3	224 39.5	34.4	Peacock	53 08.5 S56	39.6
	03	212 32.2	192 20.2	15.4	130 22.9	33.1	199 16.6	29.5	239 41.7	34.3	Pollux	243 18.9 N27	58.2
	04	227 34.6	207 19.8	16.6	145 24.2	33.2	214 18.5	29.7	254 43.9	34.2	Procyon	244 52.2 N 5	09.9
	05	242 37.1	222 19.5	17.9	160 25.4	33.2	229 20.4	30.0	269 46.1	34.1			
	06	257 39.6	237 19.2 N	8 19.1	175 26.7 N25	33.2	244 22.4 N	4 30.2	284 48.3 S12	34.0	Rasalhague	96 00.0 N12	32.4
	07	272 42.0	252 18.8	20.4	190 27.9	33.3	259 24.3	30.4	299 50.5	33.9	Regulus	207 35.8 N11	51.2
	08	287 44.5	267 18.5	21.6	205 29.2	33.3	274 26.2	30.6	314 52.6	33.8	Rigel	281 05.3 S 8	10.7
	09	302 46.9	282 18.2	22.8	220 30.5	33.3	289 28.2	30.9	329 54.8	33.7	Rigel Kent.	139 42.0 S60	55.6
	10	317 49.4	297 17.8	24.1	235 31.7	33.4	304 30.1	31.1	344 57.0	33.6	Sabik	102 04.5 S15	45.3
	11	332 51.9	312 17.5	25.3	250 33.0	33.4	319 32.0	31.3	359 59.2	33.5			
	12	347 54.3	327 17.2 N	8 26.6	265 34.2 N25	33.4	334 34.0 N	4 31.5	15 01.4 S12	33.4	Schedar	349 33.3 N56	39.8
	13	2 56.8	342 16.8	27.8	280 35.5	33.4	349 35.9	31.8	30 03.6	33.3	Shaula	96 12.5 S37	07.1
	14	17 59.3	357 16.5	29.1	295 36.7	33.5	4 37.8	32.0	45 05.7	33.2	Sirius	258 27.5 S16	45.0
	15	33 01.7	12 16.2	30.3	310 38.0	33.5	19 39.7	32.2	60 07.9	33.1	Spica	158 23.6 S11	17.0
	16	48 04.2	27 15.8	31.6	325 39.2	33.5	34 41.7	32.5	75 10.1	33.0	Suhail	222 47.1 S43	31.7
	17	63 06.7	42 15.5	32.8	340 40.5	33.6	49 43.6	32.7	90 12.3	32.9			
	18	78 09.1	57 15.2 N	8 34.1	355 41.7 N25	33.6	64 45.5 N	4 32.9	105 14.5 S12	32.8	Vega	80 34.4 N38	48.0
	19	93 11.6	72 14.8	35.3	10 43.0	33.6	79 47.5	33.1	120 16.7	32.7	Zuben'ubi	136 57.5 S16	08.3
	20	108 14.1	87 14.5	36.6	25 44.2	33.6	94 49.4	33.4	135 18.9	32.6			
	21	123 16.5	102 14.2	37.8	40 45.5	33.7	109 51.3	33.6	150 21.0	32.5			
	22	138 19.0	117 13.8	39.0	55 46.7	33.7	124 53.3	33.8	165 23.2	32.4	Venus	341 03.4 h m	14 10
	23	153 21.4	132 13.5	40.3	70 48.0	33.7	139 55.2	34.0	180 25.4	32.3	Mars	278 23.1 h m	18 19
											Jupiter	346 58.7 h m	13 45
											Saturn	27 17.2 h m	11 04
Mer.Pass. 12 52.2		v -0.3 d 1.3			v 1.3 d 0.0		v 1.9 d 0.2		v 2.2 d 0.1				

UT	SUN			MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec		GHA	v	Dec	d		HP	Naut.		Civil	8	9	10	11
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m
WEDNESDAY	8 00	177 16.2	S 5 04.7	351 00.5	16.0	N 6 10.3	14.0	54.9	N 70	04 30	05 49	06 57	18 47	20 50	23 03	26 06
	01	192 16.3	03.7	5 35.5	16.0	5 56.3	14.0	54.9	68	04 39	05 51	06 51	18 50	20 43	22 44	25 08
	02	207 16.5	02.7	20 10.5	16.1	5 42.3	14.1	55.0	66	04 47	05 52	06 47	18 52	20 37	22 29	24 35
	03	222 16.6	. 01.7	34 45.6	16.0	5 28.2	14.1	55.0	64	04 53	05 53	06 44	18 53	20 33	22 17	24 11
	04	237 16.8	5 00.8	49 20.6	16.0	5 14.1	14.1	55.0	62	04 58	05 54	06 41	18 55	20 29	22 07	23 52
	05	252 17.0	4 59.8	63 55.6	16.1	5 00.0	14.2	55.0	60	05 03	05 54	06 38	18 56	20 25	21 58	23 37
	06	267 17.1	S 4 58.8	78 30.7	16.0	N 4 45.8	14.1	55.0	N 58	05 06	05 54	06 36	18 57	20 22	21 51	23 24
	07	282 17.3	57.8	93 05.7	16.1	4 31.7	14.2	55.0	56	05 09	05 55	06 34	18 58	20 20	21 45	23 14
	08	297 17.4	56.9	107 40.8	16.0	4 17.5	14.3	55.1	54	05 12	05 55	06 32	18 58	20 17	21 39	23 04
	09	312 17.6	. 55.9	122 15.8	16.1	4 03.2	14.2	55.1	52	05 14	05 55	06 30	18 59	20 15	21 34	22 56
	10	327 17.7	54.9	136 50.9	16.1	3 49.0	14.3	55.1	50	05 16	05 55	06 29	19 00	20 14	21 29	22 49
	11	342 17.9	53.9	151 26.0	16.0	3 34.7	14.3	55.1	45	05 18	05 55	06 27	19 00	20 12	21 25	22 42
	12	357 18.0	S 4 53.0	166 01.0	16.1	N 3 20.4	14.3	55.1	N 40	05 21	05 55	06 24	19 02	20 08	21 17	22 28
	13	12 18.2	52.0	180 36.1	16.0	3 06.1	14.3	55.1	35	05 23	05 55	06 22	19 03	20 05	21 09	22 16
	14	27 18.3	51.0	195 11.1	16.1	2 51.8	14.4	55.2	30	05 25	05 54	06 19	19 04	20 03	21 03	22 06
	15	42 18.5	. 50.0	209 46.2	16.0	2 37.4	14.4	55.2	20	05 26	05 53	06 17	19 04	20 00	20 58	21 58
	16	57 18.6	49.1	224 21.2	16.0	2 23.0	14.4	55.2	N 10	05 26	05 52	06 14	19 06	19 56	20 48	21 43
	17	72 18.8	48.1	238 56.2	16.0	2 08.6	14.4	55.2	0	05 25	05 49	06 10	19 07	19 53	20 40	21 30
	18	87 18.9	S 4 47.1	253 31.2	16.1	N 1 54.2	14.4	55.2	S 10	05 22	05 47	06 07	19 08	19 50	20 33	21 18
	19	102 19.1	46.1	268 06.3	16.0	1 39.8	14.4	55.2	20	05 18	05 43	06 04	19 09	19 47	20 25	21 07
	20	117 19.3	45.2	282 41.3	16.0	1 25.4	14.5	55.3	30	05 12	05 38	06 00	19 11	19 43	20 17	20 54
	21	132 19.4	. 44.2	297 16.3	16.0	1 10.9	14.5	55.3	35	05 04	05 32	05 56	19 12	19 40	20 08	20 40
	22	147 19.6	43.2	311 51.3	15.9	0 56.4	14.5	55.3	40	04 58	05 28	05 54	19 13	19 37	20 03	20 32
	23	162 19.7	42.2	326 26.2	16.0	0 41.9	14.4	55.3	45	04 51	05 23	05 51	19 14	19 35	19 57	20 23
	THURSDAY	9 00	177 19.9	S 4 41.3	341 01.2	15.9	N 0 27.5	14.5	55.3	S 50	04 42	05 18	05 47	19 15	19 32	19 51
01		192 20.0	40.3	355 36.1	16.0	N 0 13.0	14.6	55.3	52	04 31	05 11	05 43	19 16	19 29	19 43	19 59
02		207 20.2	39.3	10 11.1	15.9	S 0 01.6	14.5	55.4	54	04 26	05 07	05 42	19 17	19 28	19 39	19 53
03		222 20.3	. 38.3	24 46.0	15.9	0 16.1	14.5	55.4	56	04 20	05 03	05 39	19 18	19 26	19 35	19 46
04		237 20.5	37.4	39 20.9	15.9	0 30.6	14.5	55.4	58	04 13	04 59	05 37	19 18	19 24	19 31	19 39
05		252 20.7	36.4	53 55.8	15.8	0 45.1	14.6	55.4	S 60	04 05	04 54	05 35	19 19	19 22	19 26	19 31
06		267 20.8	S 4 35.4	68 30.6	15.9	S 0 59.7	14.5	55.4	Lat.		Twilight		Moonset			
07		282 21.0	34.4	83 05.5	15.8	1 14.2	14.6	55.5	Sunset		Civil		Naut.		8	
08		297 21.1	33.5	97 40.3	15.8	1 28.8	14.5	55.5					9		10	
09		312 21.3	. 32.5	112 15.1	15.8	1 43.3	14.6	55.5					10		11	
10		327 21.4	31.5	126 49.9	15.7	1 57.9	14.6	55.5	°	h m	h m	h m	h m	h m	h m	h m
11		342 21.6	30.5	141 24.6	15.7	2 12.5	14.5	55.5	N 72	17 27	18 34	19 55	07 42	07 11	06 38	05 56
12		357 21.8	S 4 29.5	155 59.3	15.7	S 2 27.0	14.6	55.5	N 70	17 32	18 32	19 45	07 36	07 13	06 48	06 18
13		12 21.9	28.6	170 34.0	15.7	2 41.6	14.5	55.6	68	17 36	18 31	19 37	07 31	07 14	06 56	06 35
14		27 22.1	27.6	185 08.7	15.6	2 56.1	14.6	55.6	66	17 39	18 30	19 30	07 27	07 15	07 03	06 49
15		42 22.2	. 26.6	199 43.3	15.6	3 10.7	14.5	55.6	64	17 42	18 29	19 25	07 24	07 16	07 09	07 00
16		57 22.4	25.6	214 17.9	15.6	3 25.2	14.6	55.6	62	17 44	18 29	19 20	07 21	07 17	07 14	07 10
17		72 22.5	24.7	228 52.5	15.5	3 39.8	14.5	55.6	60	17 47	18 28	19 17	07 18	07 18	07 18	07 19
18		87 22.7	S 4 23.7	243 27.0	15.6	S 3 54.3	14.6	55.7	N 58	17 49	18 28	19 13	07 16	07 19	07 22	07 26
19		102 22.9	22.7	258 01.6	15.4	4 08.9	14.5	55.7	56	17 50	18 27	19 11	07 14	07 20	07 26	07 33
20		117 23.0	21.7	272 36.0	15.5	4 23.4	14.5	55.7	54	17 52	18 27	19 08	07 12	07 20	07 29	07 39
21		132 23.2	. 20.7	287 10.5	15.4	4 37.9	14.5	55.7	52	17 53	18 27	19 06	07 10	07 21	07 32	07 44
22		147 23.3	19.8	301 44.9	15.3	4 52.4	14.5	55.7	50	17 55	18 27	19 04	07 09	07 21	07 34	07 49
23		162 23.5	18.8	316 19.2	15.4	5 06.9	14.5	55.8	45	17 58	18 27	19 01	07 05	07 22	07 40	07 59
FRIDAY		10 00	177 23.7	S 4 17.8	330 53.6	15.3	S 5 21.4	14.5	55.8	N 40	18 00	18 27	18 58	07 02	07 23	07 45
	01	192 23.8	16.8	345 27.9	15.2	5 35.9	14.5	55.8	35	18 02	18 28	18 57	07 00	07 24	07 49	08 16
	02	207 24.0	15.8	0 02.1	15.2	5 50.4	14.4	55.8	30	18 04	18 28	18 56	06 58	07 25	07 53	08 23
	03	222 24.1	. 14.9	14 36.3	15.2	6 04.8	14.5	55.8	20	18 08	18 30	18 55	06 54	07 26	07 59	08 34
	04	237 24.3	13.9	29 10.5	15.1	6 19.3	14.4	55.9	N 10	18 11	18 32	18 56	06 50	07 27	08 05	08 44
	05	252 24.4	12.9	43 44.6	15.1	6 33.7	14.4	55.9	0	18 14	18 35	18 59	06 47	07 28	08 10	08 54
	06	267 24.6	S 4 11.9	58 18.7	15.0	S 6 48.1	14.4	55.9	S 10	18 17	18 38	19 03	06 43	07 29	08 15	09 04
	07	282 24.8	11.0	72 52.7	15.0	7 02.5	14.3	55.9	20	18 20	18 43	19 08	06 40	07 30	08 21	09 14
	08	297 24.9	10.0	87 26.7	14.9	7 16.8	14.4	55.9	30	18 25	18 49	19 17	06 36	07 31	08 28	09 26
	09	312 25.1	. 09.0	102 00.6	14.9	7 31.2	14.3	56.0	35	18 27	18 52	19 22	06 33	07 32	08 31	09 33
	10	327 25.2	08.0	116 34.5	14.8	7 45.5	14.3	56.0	40	18 30	18 57	19 29	06 31	07 33	08 36	09 41
	11	342 25.4	07.0	131 08.3	14.8	7 59.8	14.3	56.0	45	18 33	19 02	19 38	06 27	07 33	08 41	09 50
	12	357 25.6	S 4 06.1	145 42.1	14.7	S 8 14.1	14.2	56.0	S 50	18 37	19 09	19 49	06 24	07 35	08 47	10 02
	13	12 25.7	05.1	160 15.8	14.7	8 28.3	14.3	56.0	52	18 38	19 13	19 54	06 22	07 35	08 50	10 07
	14	27 25.9	04.1	174 49.5	14.6	8 42.6	14.2	56.1	54	18 40	19 16	20 00	06 20	07 36	08 53	10 13
	15	42 26.1	. 03.1	189 23.1	14.6	8 56.8	14.2	56.1	56	18 43	19 21	20 07	06 18	07 36	08 56	10 19
	16	57 26.2	02.1	203 56.7	14.5	9 11.0	14.1	56.1	58	18 45	19 25	20 15	06 15	07 37	09 00	10 26
	17	72 26.4	01.2	218 30.2	14.4	9 25.1	14.1	56.1	S 60	18 48	19 30	20 24	06 13	07 37	09 04	10 35
	18	87 26.5	S 4 00.2	233 03.6	14.4	S 9 39.2	14.1	56.1	SUN		MOON					
	19	102 26.7	3 59.2	247 37.0	14.3	9 53.3	14.1	56.2	Day	Eqn. of Time		Mer. Pass.	Mer. Pass.		Age	Phase
	20	117 26.9	58.2	262 10.3	14.3	10 07.4	14.0	56.2		00 ^h 12 ^h			Upper Lower			
	21	132 27.0	. 57.2	276 43.6	14.2	10 21.4	14.0	56.2	d	m s	m s	h m	h m	h m	d %	
	22	147 27.2	56.3	291 16.8	14.1	10 35.4	13.9	56.2	8	10 56	10 48	12 11	00 37	12 58	16 99	
	23	162 27.3	55.3	305 49.9	14.1	S10 49										

UT	ARIES		VENUS −4.0		MARS +0.6		JUPITER −2.1		SATURN +0.8		STARS		
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA	Dec			
SATURDAY	168 23.9	147 13.1 N 8 41.5	85 49.2 N25 33.8	154 57.1 N 4 34.3	195 27.6 S12 32.2	Acamar	315 13.2 S40 13.0						
	183 26.4	162 12.8 42.8	100 50.5 33.8	169 59.1 34.5	210 29.8 32.1	Achernar	335 21.8 S57 07.4						
	198 28.8	177 12.5 44.0	115 51.7 33.8	185 01.0 34.7	225 32.0 32.0	Acruhs	173 01.1 S63 13.6						
	213 31.3	192 12.1 . . 45.3	130 53.0 . . 33.8	200 02.9 . . 35.0	240 34.1 . . 31.9	Adhara	255 06.9 S29 00.4						
	228 33.8	207 11.8 46.5	145 54.2 33.9	215 04.8 35.2	255 36.3 31.8	Aldebaran	290 41.4 N16 33.3						
	243 36.2	222 11.5 47.7	160 55.5 33.9	230 06.8 35.4	270 38.5 31.7								
	258 38.7	237 11.1 N 8 49.0	175 56.7 N25 33.9	245 08.7 N 4 35.6	285 40.7 S12 31.6	Alioth	166 13.8 N55 49.9						
	273 41.2	252 10.8 50.2	190 58.0 34.0	260 10.6 35.9	300 42.9 31.5	Alkaid	152 52.8 N49 11.7						
	288 43.6	267 10.5 51.5	205 59.2 34.0	275 12.6 36.1	315 45.1 31.4	Alnair	27 35.2 S46 51.0						
	303 46.1	282 10.1 . . 52.7	221 00.5 . . 34.0	290 14.5 . . 36.3	330 47.2 . . 31.3	Alnilam	275 39.3 S 1 11.3						
	318 48.6	297 09.8 53.9	236 01.7 34.0	305 16.4 36.5	345 49.4 31.2	Alphard	217 49.0 S 8 45.6						
	333 51.0	312 09.4 55.2	251 03.0 34.1	320 18.4 36.8	0 51.6 31.1								
	348 53.5	327 09.1 N 8 56.4	266 04.2 N25 34.1	335 20.3 N 4 37.0	15 53.8 S12 31.0	Alphecca	126 04.9 N26 38.0						
	3 55.9	342 08.8 57.7	281 05.5 34.1	350 22.2 37.2	30 56.0 30.9	Alpheratz	357 36.7 N29 13.0						
	18 58.4	357 08.4 8 58.9	296 06.7 34.1	5 24.1 37.5	45 58.2 30.8	Altair	62 01.6 N 8 55.5						
	34 00.9	12 08.1 9 00.1	311 07.9 . . 34.2	20 26.1 . . 37.7	61 00.4 . . 30.7	Ankaa	353 09.0 S42 11.0						
	49 03.3	27 07.8 01.4	326 09.2 34.2	35 28.0 37.9	76 02.5 30.6	Antares	112 17.6 S26 29.0						
	64 05.8	42 07.4 02.6	341 10.4 34.2	50 29.9 38.1	91 04.7 30.5								
	79 08.3	57 07.1 N 9 03.8	356 11.7 N25 34.3	65 31.9 N 4 38.4	106 06.9 S12 30.4	Arcturus	145 49.1 N19 03.5						
	94 10.7	72 06.7 05.1	11 12.9 34.3	80 33.8 38.6	121 09.1 30.3	Atria	107 13.2 S69 03.9						
	109 13.2	87 06.4 06.3	26 14.2 34.3	95 35.7 38.8	136 11.3 30.2	Avior	234 14.9 S59 35.2						
	124 15.7	102 06.1 . . 07.6	41 15.4 . . 34.3	110 37.6 . . 39.1	151 13.5 . . 30.1	Bellatrix	278 24.5 N 6 22.2						
	139 18.1	117 05.7 08.8	56 16.6 34.4	125 39.6 39.3	166 15.6 30.0	Betelgeuse	270 53.7 N 7 24.6						
	154 20.6	132 05.4 10.0	71 17.9 34.4	140 41.5 39.5	181 17.8 29.9								
	SUNDAY	169 23.0	147 05.0 N 9 11.3	86 19.1 N25 34.4	155 43.4 N 4 39.7	196 20.0 S12 29.8	Canopus	263 52.9 S52 42.7					
184 25.5		162 04.7 12.5	101 20.4 34.4	170 45.4 40.0	211 22.2 29.7	Capella	280 24.1 N46 01.4						
199 28.0		177 04.4 13.7	116 21.6 34.5	185 47.3 40.2	226 24.4 29.6	Deneb	49 27.2 N45 21.5						
214 30.4		192 04.0 . . 15.0	131 22.8 . . 34.5	200 49.2 . . 40.4	241 26.6 . . 29.5	Denebola	182 26.2 N14 26.5						
229 32.9		207 03.7 16.2	146 24.1 34.5	215 51.1 40.6	256 28.8 29.4	Diphda	348 49.1 S17 51.8						
244 35.4		222 03.3 17.4	161 25.3 34.5	230 53.1 40.9	271 30.9 29.3								
259 37.8		237 03.0 N 9 18.7	176 26.5 N25 34.6	245 55.0 N 4 41.1	286 33.1 S12 29.2	Dubhe	193 42.2 N61 37.6						
274 40.3		252 02.6 19.9	191 27.8 34.6	260 56.9 41.3	301 35.3 29.1	Elnath	278 03.8 N28 37.6						
289 42.8		267 02.3 21.1	206 29.0 34.6	275 58.9 41.6	316 37.5 29.0	Eltanin	90 43.0 N51 28.8						
304 45.2		282 02.0 . . 22.4	221 30.3 . . 34.6	291 00.8 . . 41.8	331 39.7 . . 28.9	Enif	33 40.6 N 9 58.7						
319 47.7		297 01.6 23.6	236 31.5 34.7	306 02.7 42.0	346 41.9 28.8	Fomalhaut	15 16.5 S29 30.1						
334 50.2		312 01.3 24.8	251 32.7 34.7	321 04.6 42.2	1 44.1 28.7								
349 52.6		327 00.9 N 9 26.1	266 34.0 N25 34.7	336 06.6 N 4 42.5	16 46.2 S12 28.6	Gacrux	171 52.8 S57 14.5						
4 55.1		342 00.6 27.3	281 35.2 34.7	351 08.5 42.7	31 48.4 28.5	Gienah	175 44.8 S17 40.3						
19 57.5		357 00.3 28.5	296 36.4 34.7	6 10.4 42.9	46 50.6 28.4	Hadar	148 37.7 S60 28.9						
35 00.0		11 59.9 . . 29.7	311 37.7 . . 34.8	21 12.4 . . 43.2	61 52.8 . . 28.3	Hamal	327 53.2 N23 34.2						
50 02.5		26 59.6 31.0	326 38.9 34.8	36 14.3 43.4	76 55.0 28.2	Kaus Aust.	83 34.6 S34 22.4						
65 04.9		41 59.2 32.2	341 40.1 34.8	51 16.2 43.6	91 57.2 28.1								
80 07.4		56 58.9 N 9 33.4	356 41.4 N25 34.8	66 18.1 N 4 43.8	106 59.4 S12 28.0	Kochab	137 19.0 N74 03.3						
95 09.9		71 58.5 34.7	11 42.6 34.9	81 20.1 44.1	122 01.5 27.9	Markab	13 31.7 N15 19.6						
110 12.3		86 58.2 35.9	26 43.8 34.9	96 22.0 44.3	137 03.7 27.8	Menkar	314 07.9 N 4 10.7						
125 14.8		101 57.8 . . 37.1	41 45.1 . . 34.9	111 23.9 . . 44.5	152 05.9 . . 27.7	Menkent	147 59.1 S36 29.0						
140 17.3		116 57.5 38.3	56 46.3 34.9	126 25.8 44.7	167 08.1 27.6	Miaplacidus	221 37.8 S69 48.8						
155 19.7		131 57.2 39.6	71 47.5 34.9	141 27.8 45.0	182 10.3 27.5								
MONDAY		170 22.2	146 56.8 N 9 40.8	86 48.7 N25 35.0	156 29.7 N 4 45.2	197 12.5 S12 27.4	Mirfak	308 30.7 N49 56.7					
	185 24.7	161 56.5 42.0	101 50.0 35.0	171 31.6 45.4	212 14.7 27.3	Nunki	75 49.8 S26 16.1						
	200 27.1	176 56.1 43.2	116 51.2 35.0	186 33.5 45.7	227 16.8 27.2	Peacock	53 08.5 S56 39.6						
	215 29.6	191 55.8 . . 44.5	131 52.4 . . 35.0	201 35.5 . . 45.9	242 19.0 . . 27.1	Pollux	243 19.0 N27 58.2						
	230 32.0	206 55.4 45.7	146 53.7 35.1	216 37.4 46.1	257 21.2 27.0	Procyon	244 52.3 N 5 09.9						
	245 34.5	221 55.1 46.9	161 54.9 35.1	231 39.3 46.3	272 23.4 26.9								
	260 37.0	236 54.7 N 9 48.1	176 56.1 N25 35.1	246 41.3 N 4 46.6	287 25.6 S12 26.8	Rasalhague	96 00.0 N12 32.4						
	275 39.4	251 54.4 49.4	191 57.3 35.1	261 43.2 46.8	302 27.8 26.7	Regulus	207 35.8 N11 51.2						
	290 41.9	266 54.0 50.6	206 58.6 35.1	276 45.1 47.0	317 30.0 26.6	Rigel	281 05.3 S 8 10.7						
	305 44.4	281 53.7 . . 51.8	221 59.8 . . 35.2	291 47.0 . . 47.3	332 32.2 . . 26.6	Rigel Kent.	139 42.0 S60 55.6						
	320 46.8	296 53.3 53.0	237 01.0 35.2	306 49.0 47.5	347 34.3 26.5	Sabik	102 04.5 S15 45.3						
	335 49.3	311 53.0 54.3	252 02.2 35.2	321 50.9 47.7	2 36.5 26.4								
	350 51.8	326 52.7 N 9 55.5	267 03.5 N25 35.2	336 52.8 N 4 47.9	17 38.7 S12 26.3	Schedar	349 33.3 N56 39.8						
	5 54.2	341 52.3 56.7	282 04.7 35.2	351 54.7 48.2	32 40.9 26.2	Shaula	96 12.5 S37 07.1						
	20 56.7	356 52.0 57.9	297 05.9 35.3	6 56.7 48.4	47 43.1 26.1	Sirius	258 27.5 S16 45.0						
	35 59.1	11 51.6 9 59.1	312 07.1 . . 35.3	21 58.6 . . 48.6	62 45.3 . . 26.0	Spica	158 23.6 S11 17.0						
	51 01.6	26 51.3 10 00.4	327 08.4 35.3	37 00.5 48.9	77 47.5 25.9	Suhail	222 47.1 S43 31.7						
	66 04.1	41 50.9 01.6	342 09.6 35.3	52 02.4 49.1	92 49.6 25.8								
	81 06.5	56 50.6 N10 02.8	357 10.8 N25 35.3	67 04.4 N 4 49.3	107 51.8 S12 25.7	Vega	80 34.4 N38 48.0						
	96 09.0	71 50.2 04.0	12 12.0 35.4	82 06.3 49.5	122 54.0 25.6	Zuben'ubi	136 57.5 S16 08.3						
	111 11.5	86 49.9 05.2	27 13.3 35.4	97 08.2 49.8	137 56.2 25.5								
	126 13.9	101 49.5 . . 06.5	42 14.5 . . 35.4	112 10.1 . . 50.0	152 58.4 . . 25.4								
	141 16.4	116 49.2 07.7	57 15.7 35.4	127 12.1 50.2	168 00.6 25.3	Venus	337 42.0 14 12						
	156 18.9	131 48.8 08.9	72 16.9 35.4	142 14.0 50.5	183 02.8 25.2	Mars	276 56.1 18 13						
						Jupiter	346 20.4 13 35						
					Saturn	26 57.0 10 53							

UT	SUN			MOON							Lat.	Twilight		Sunrise	Moonrise																	
	GHA	Dec		GHA	v	Dec	d	HP	Naut.	Civil		11	12		13	14																
d	h	m	s	°	'	"	°	'	"	°	'	"	h	m	s	°	'	"	h	m	s	°	'	"								
SATURDAY	11	00	177	27.5	S	3	54.3	320	23.0	14.0	S11	03.2	13.9	56.3	N	72	04	13	05	34	06	41	26	06	02	06						
	01	192	27.7				53.3	334	56.0	13.9	11	17.1	13.8	56.3	N	70	04	24	05	37	06	38	25	08	01	08						
	02	207	27.8				52.3	349	28.9	13.9	11	30.9	13.8	56.3	68	04	34	05	40	06	35	24	35	00	35	03	52					
	03	222	28.0				51.3	4	01.8	13.8	11	44.7	13.8	56.3	66	04	41	05	42	06	32	24	11	00	11	02	28					
	04	237	28.2				50.4	18	34.6	13.7	11	58.5	13.7	56.3	64	04	47	05	43	06	30	23	52	25	51	01	51	04	22			
	05	252	28.3				49.4	33	07.3	13.7	12	12.2	13.7	56.4	62	04	53	05	44	06	28	23	37	25	25	01	25	03	22			
	06	267	28.5	S	3	48.4		47	40.0	13.5	S12	25.9	13.6	56.4	60	04	57	05	46	06	27	23	24	25	04	01	04	02	49			
	07	282	28.6				47.4	62	12.5	13.5	12	39.5	13.6	56.4	N	58	05	04	05	47	06	24	23	04	24	34	00	34	02	04		
	08	297	28.8				46.4	76	45.0	13.5	12	53.1	13.5	56.4	56	05	07	05	48	06	23	22	56	24	21	00	21	01	48			
	09	312	29.0				45.5	91	17.5	13.3	13	06.6	13.5	56.5	54	05	09	05	48	06	22	22	49	24	11	00	11	01	34			
SUNDAY	10	327	29.1				44.5	105	49.8	13.3	13	20.1	13.4	56.5	52	05	11	05	49	06	21	22	42	24	01	00	01	01	22			
	11	342	29.3				43.5	120	22.1	13.2	13	33.5	13.4	56.5	50	05	16	05	50	06	19	22	28	23	42	24	57	00	57			
	12	357	29.5	S	3	42.5		134	54.3	13.1	S13	46.9	13.3	56.5	N	40	05	19	05	50	06	17	22	16	23	26	24	37	00	37		
	13	12	29.6				41.5	149	26.4	13.1	14	00.2	13.3	56.5	35	05	21	05	50	06	15	22	06	23	12	24	20	00	20			
	14	27	29.8				40.6	163	58.5	13.0	14	13.5	13.2	56.6	30	05	22	05	50	06	14	21	58	23	01	24	06	00	06			
	15	42	30.0				39.6	178	30.5	12.8	14	26.7	13.2	56.6	20	05	24	05	49	06	11	21	43	22	41	23	42	24	45			
	16	57	30.1				38.6	193	02.3	12.8	14	39.9	13.1	56.6	N	10	05	23	05	48	06	09	21	30	22	24	23	21	24	21		
	17	72	30.3				37.6	207	34.1	12.8	14	53.0	13.1	56.6	0	05	22	05	46	06	07	21	18	22	08	23	02	24	00			
	18	87	30.5	S	3	36.6		222	05.9	12.6	S15	06.1	12.9	56.7	S	10	05	19	05	43	06	04	21	07	21	52	22	42	23	38		
	19	102	30.6				35.6	236	37.5	12.5	15	19.0	13.0	56.7	20	05	13	05	39	06	01	20	54	21	35	22	22	23	15			
20	117	30.8				34.7	251	09.0	12.5	15	32.0	12.8	56.7	30	05	06	05	34	05	58	20	40	21	16	21	58	22	49				
21	132	30.9				33.7	265	40.5	12.4	15	44.8	12.8	56.7	35	05	01	05	31	05	56	20	32	21	05	21	45	22	33				
22	147	31.1				32.7	280	11.9	12.2	15	57.6	12.8	56.7	40	04	55	05	27	05	54	20	23	20	52	21	29	22	15				
23	162	31.3				31.7	294	43.1	12.2	16	10.4	12.6	56.8	45	04	47	05	22	05	51	20	12	20	37	21	10	21	53				
MONDAY	12	00	177	31.4	S	3	30.7	309	14.3	12.1	S16	23.0	12.7	56.8	S	50	04	37	05	16	05	48	19	59	20	19	20	47	21	25		
	01	192	31.6				29.7	323	45.4	12.0	16	35.7	12.5	56.8	52	04	32	05	13	05	47	19	53	20	11	20	35	21	12			
	02	207	31.8				28.8	338	16.4	12.0	16	48.2	12.4	56.8	54	04	26	05	09	05	45	19	46	20	01	20	23	20	56			
	03	222	31.9				27.8	352	47.4	11.8	17	00.6	12.4	56.9	56	04	20	05	06	05	44	19	39	19	51	20	08	20	38			
	04	237	32.1				26.8	7	18.2	11.7	17	13.0	12.4	56.9	58	04	13	05	02	05	42	19	31	19	38	19	52	20	16			
	05	252	32.3				25.8	21	48.9	11.6	17	25.4	12.2	56.9	S	60	04	04	04	57	05	39	19	21	19	24	19	31	19	47		
	06	267	32.4	S	3	24.8		36	19.5	11.6	S17	37.6	12.2	56.9	Lat.		Sunset		Twilight		Moonset											
	07	282	32.6				23.8	50	50.1	11.4	17	49.8	12.1	57.0					Civil		Naut.		11	12	13	14						
	08	297	32.8				22.9	65	20.5	11.4	18	01.9	12.0	57.0																		
	09	312	32.9				21.9	79	50.9	11.2	18	13.9	11.9	57.0																		
10	327	33.1				20.9	94	21.1	11.2	18	25.8	11.9	57.0																			
11	342	33.3				19.9	108	51.3	11.0	18	37.7	11.7	57.1	N	72	17	41	18	48	20	10	05	56	04	31							
12	357	33.4	S	3	18.9		123	21.3	11.0	S18	49.4	11.7	57.1	N	70	17	44	18	45	19	58	06	18	05	30							
13	12	33.6				17.9	137	51.3	10.8	19	01.1	11.6	57.1	68	17	47	18	42	19	49	06	35	06	05	04	32						
14	27	33.8				17.0	152	21.1	10.8	19	12.7	11.5	57.1	66	17	49	18	40	19	41	06	49	06	30	05	57						
15	42	33.9				16.0	166	50.9	10.6	19	24.2	11.4	57.1	64	17	51	18	38	19	34	07	00	06	50	06	36	05	59				
16	57	34.1				15.0	181	20.5	10.6	19	35.6	11.4	57.2	62	17	53	18	37	19	29	07	10	07	06	07	03	06	59				
17	72	34.3				14.0	195	50.1	10.4	19	47.0	11.2	57.2	60	17	54	18	35	19	24	07	19	07	20	07	24	07	33				
18	87	34.4	S	3	13.0		210	19.5	10.3	S19	58.2	11.1	57.2	N	58	17	55	18	34	19	20	07	26	07	32	07	41	07	58			
19	102	34.6				12.0	224	48.8	10.3	20	09.3	11.1	57.2	56	17	57	18	34	19	17	07	33	07	42	07	56	08	18				
20	117	34.8				11.1	239	18.1	10.1	20	20.4	10.9	57.3	54	17	58	18	33	19	14	07	39	07	51	08	09	08	35				
21	132	34.9				10.1	253	47.2	10.0	20	31.3	10.9	57.3	52	17	59	18	32	19	12	07	44	07	59	08	20	08	49				
22	147	35.1				09.1	268	16.2	9.9	20	42.2	10.7	57.3	50	18	00	18	32	19	09	07	49	08	07	08	30	09	02				
23	162	35.3				08.1	282	45.1	9.8	20	52.9	10.7	57.3	45	18	02	18	31	19	05	07	59	08	22	08	51	09	28				
TUESDAY	13	00	177	35.4	S	3	07.1	297	13.9	9.7	S21	03.6	10.6	57.4	N	40	18	03	18	30	19	02	08	08	08	35	09	08	09	49		
	01	192	35.6				06.1	311	42.6	9.6	21	14.2	10.4	57.4	35	18	05	18	30	18	59	08	16	08	46	09	22	10	06			
	02	207	35.8				05.2	326	11.2	9.5	21	24.6	10.3	57.4	30	18	06	18	30	18	58	08	23	08	56	09	35	10	21			
	03	222	36.0				04.2	340	39.7	9.4	21	34.9																				

UT	ARIES		VENUS −4.0		MARS +0.7		JUPITER −2.1		SATURN +0.9		STARS										
	GHA	GHA Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec								
TUESDAY	14 00	171 21.3	146 48.5 N10 10.1	87 18.1 N25 35.5	157 15.9 N 4 50.7	198 05.0 S12 25.1	Acamar	315 13.2 S40 13.0													
	01	186 23.8	161 48.1 11.3	102 19.4 35.5	172 17.8 50.9	213 07.1 25.0	Achernar	335 21.8 S57 07.4													
	02	201 26.3	176 47.8 12.5	117 20.6 35.5	187 19.8 51.1	228 09.3 24.9	Acrux	173 01.1 S63 13.6													
	03	216 28.7	191 47.4 . . 13.8	132 21.8 . . 35.5	202 21.7 . . 51.4	243 11.5 . . 24.8	Adhara	255 06.9 S29 00.4													
	04	231 31.2	206 47.1 15.0	147 23.0 35.5	217 23.6 51.6	258 13.7 24.7	Aldebaran	290 41.4 N16 33.3													
	05	246 33.6	221 46.7 16.2	162 24.2 35.5	232 25.5 51.8	273 15.9 24.6															
	06	261 36.1	236 46.4 N10 17.4	177 25.5 N25 35.6	247 27.5 N 4 52.0	288 18.1 S12 24.5	Alioth	166 13.8 N55 49.9													
	07	276 38.6	251 46.0 18.6	192 26.7 35.6	262 29.4 52.3	303 20.3 24.4	Alkaid	152 52.8 N49 11.7													
	08	291 41.0	266 45.7 19.8	207 27.9 35.6	277 31.3 52.5	318 22.5 24.3	Alnair	27 35.2 S46 51.1													
	09	306 43.5	281 45.3 . . 21.0	222 29.1 . . 35.6	292 33.2 . . 52.7	333 24.6 . . 24.2	Alnilam	275 39.3 S 1 11.1													
	10	321 46.0	296 45.0 22.3	237 30.3 35.6	307 35.2 53.0	348 26.8 24.1	Alphard	217 49.0 S 8 45.6													
	11	336 48.4	311 44.6 23.5	252 31.5 35.7	322 37.1 53.2	3 29.0 24.0															
	12	351 50.9	326 44.2 N10 24.7	267 32.8 N25 35.7	337 39.0 N 4 53.4	18 31.2 S12 23.9	Alphecca	126 04.8 N26 38.0													
	13	6 53.4	341 43.9 25.9	282 34.0 35.7	352 40.9 53.6	33 33.4 23.8	Alpheratz	357 36.7 N29 13.0													
	14	21 55.8	356 43.5 27.1	297 35.2 35.7	7 42.9 53.9	48 35.6 23.7	Altair	62 01.6 N 8 55.5													
	15	36 58.3	11 43.2 . . 28.3	312 36.4 . . 35.7	22 44.8 . . 54.1	63 37.8 . . 23.6	Ankaa	353 09.0 S42 11.0													
	16	52 00.8	26 42.8 29.5	327 37.6 35.7	37 46.7 54.3	78 40.0 23.5	Antares	112 17.6 S26 29.0													
	17	67 03.2	41 42.5 30.7	342 38.8 35.7	52 48.6 54.6	93 42.1 23.4															
	18	82 05.7	56 42.1 N10 31.9	357 40.0 N25 35.8	67 50.6 N 4 54.8	108 44.3 S12 23.3	Arcturus	145 49.0 N19 03.5													
	19	97 08.1	71 41.8 33.1	12 41.3 35.8	82 52.5 55.0	123 46.5 23.2	Atria	107 13.1 S69 03.9													
	20	112 10.6	86 41.4 34.4	27 42.5 35.8	97 54.4 55.2	138 48.7 23.1	Avior	234 14.9 S59 35.2													
	21	127 13.1	101 41.1 . . 35.6	42 43.7 . . 35.8	112 56.3 . . 55.5	153 50.9 . . 23.0	Bellatrix	278 24.5 N 6 22.2													
	22	142 15.5	116 40.7 36.8	57 44.9 35.8	127 58.3 55.7	168 53.1 22.9	Betelgeuse	270 53.7 N 7 24.6													
	23	157 18.0	131 40.3 38.0	72 46.1 35.8	143 00.2 55.9	183 55.3 22.8															
	WEDNESDAY	15 00	172 20.5	146 40.0 N10 39.2	87 47.3 N25 35.9	158 02.1 N 4 56.2	198 57.5 S12 22.7	Canopus	263 53.0 S52 42.7												
01		187 22.9	161 39.6 40.4	102 48.5 35.9	173 04.0 56.4	213 59.7 22.6	Capella	280 24.2 N46 01.4													
02		202 25.4	176 39.3 41.6	117 49.7 35.9	188 06.0 56.6	229 01.8 22.5	Deneb	49 27.2 N45 21.5													
03		217 27.9	191 38.9 . . 42.8	132 50.9 . . 35.9	203 07.9 . . 56.8	244 04.0 . . 22.4	Denebola	182 26.2 N14 26.5													
04		232 30.3	206 38.6 44.0	147 52.2 35.9	218 09.8 57.1	259 06.2 22.3	Diphda	348 49.1 S17 51.8													
05		247 32.8	221 38.2 45.2	162 53.4 35.9	233 11.7 57.3	274 08.4 22.2															
06		262 35.3	236 37.8 N10 46.4	177 54.6 N25 35.9	248 13.7 N 4 57.5	289 10.6 S12 22.1	Dubhe	193 42.2 N61 37.6													
07		277 37.7	251 37.5 47.6	192 55.8 36.0	263 15.6 57.8	304 12.8 22.0	Elmath	278 03.8 N28 37.6													
08		292 40.2	266 37.1 48.8	207 57.0 36.0	278 17.5 58.0	319 15.0 21.9	Eltanin	90 42.9 N51 28.8													
09		307 42.6	281 36.8 . . 50.0	222 58.2 . . 36.0	293 19.4 . . 58.2	334 17.2 . . 21.9	Enif	33 40.6 N 9 58.7													
10		322 45.1	296 36.4 51.2	237 59.4 36.0	308 21.3 58.4	349 19.4 21.8	Fomalhaut	15 16.5 S29 30.1													
11		337 47.6	311 36.1 52.4	253 00.6 36.0	323 23.3 58.7	4 21.5 21.7															
12		352 50.0	326 35.7 N10 53.6	268 01.8 N25 36.0	338 25.2 N 4 58.9	19 23.7 S12 21.6	Gacrux	171 52.8 S57 14.5													
13		7 52.5	341 35.3 54.8	283 03.0 36.0	353 27.1 59.1	34 25.9 21.5	Gienah	175 44.8 S17 40.3													
14		22 55.0	356 35.0 56.0	298 04.2 36.1	8 29.0 59.4	49 28.1 21.4	Hadar	148 37.7 S60 28.9													
15		37 57.4	11 34.6 . . 57.2	313 05.4 . . 36.1	23 31.0 . . 59.6	64 30.3 . . 21.3	Hamal	327 53.2 N23 34.2													
16		52 59.9	26 34.3 58.4	328 06.6 36.1	38 32.9 4 59.8	79 32.5 21.2	Kaus Aust.	83 34.6 S34 22.4													
17		68 02.4	41 33.9 10 59.6	343 07.8 36.1	53 34.8 5 00.0	94 34.7 21.1															
18		83 04.8	56 33.5 N11 00.8	358 09.0 N25 36.1	68 36.7 N 5 00.3	109 36.9 S12 21.0	Kochab	137 19.0 N74 03.3													
19		98 07.3	71 33.2 02.0	13 10.3 36.1	83 38.6 00.5	124 39.1 20.9	Markab	13 31.7 N15 19.6													
20		113 09.8	86 32.8 03.2	28 11.5 36.1	98 40.6 00.7	139 41.2 20.8	Menkar	314 07.9 N 4 10.7													
21		128 12.2	101 32.5 . . 04.4	43 12.7 . . 36.1	113 42.5 . . 01.0	154 43.4 . . 20.7	Menkent	147 59.1 S36 29.0													
22		143 14.7	116 32.1 05.6	58 13.9 36.2	128 44.4 01.2	169 45.6 20.6	Miaplacidus	221 37.9 S69 48.9													
23		158 17.1	131 31.7 06.8	73 15.1 36.2	143 46.3 01.4	184 47.8 20.5															
THURSDAY		16 00	173 19.6	146 31.4 N11 08.0	88 16.3 N25 36.2	158 48.3 N 5 01.7	199 50.0 S12 20.4	Mirfak	308 30.7 N49 56.7												
	01	188 22.1	161 31.0 09.2	103 17.5 36.2	173 50.2 01.9	214 52.2 20.3	Nunki	75 49.8 S26 16.1													
	02	203 24.5	176 30.6 10.4	118 18.7 36.2	188 52.1 02.1	229 54.4 20.2	Peacock	53 08.5 S56 39.5													
	03	218 27.0	191 30.3 . . 11.6	133 19.9 . . 36.2	203 54.0 . . 02.3	244 56.6 . . 20.1	Pollux	243 19.0 N27 58.2													
	04	233 29.5	206 29.9 12.8	148 21.1 36.2	218 55.9 02.6	259 58.8 20.0	Procyon	244 52.3 N 5 09.9													
	05	248 31.9	221 29.6 14.0	163 22.3 36.2	233 57.9 02.8	275 01.0 19.9															
	06	263 34.4	236 29.2 N11 15.2	178 23.5 N25 36.2	248 59.8 N 5 03.0	290 03.1 S12 19.8	Rasalhague	96 00.0 N12 32.4													
	07	278 36.9	251 28.8 16.4	193 24.7 36.3	264 01.7 03.3	305 05.3 19.7	Regulus	207 35.8 N11 51.2													
	08	293 39.3	266 28.5 17.6	208 25.9 36.3	279 03.6 03.5	320 07.5 19.6	Rigel	281 05.3 S 8 10.7													
	09	308 41.8	281 28.1 . . 18.8	223 27.1 . . 36.3	294 05.6 . . 03.7	335 09.7 . . 19.5	Rigil Kent.	139 41.9 S60 55.7													
	10	323 44.2	296 27.7 20.0	238 28.3 36.3	309 07.5 03.9	350 11.9 19.4	Sabik	102 04.5 S15 45.3													
	11	338 46.7	311 27.4 21.2	253 29.5 36.3	324 09.4 04.2	5 14.1 19.3															
	12	353 49.2	326 27.0 N11 22.4	268 30.7 N25 36.3	339 11.3 N 5 04.4	20 16.3 S12 19.2	Schedar	349 33.3 N56 39.8													
	13	8 51.6	341 26.6 23.5	283 31.9 36.3	354 13.2 04.6	35 18.5 19.1	Shaula	96 12.4 S37 07.1													
	14	23 54.1	356 26.3 24.7	298 33.0 36.3	9 15.2 04.9	50 20.7 19.0	Sirius	258 27.5 S16 45.0													
	15	38 56.6	11 25.9 . . 25.9	313 34.2 . . 36.3	24 17.1 . . 05.1	65 22.9 . . 18.9	Spica	158 23.6 S11 17.0													
	16	53 59.0	26 25.5 27.1	328 35.4 36.3	39 19.0 05.3	80 25.0 18.8	Suhail	222 47.1 S43 31.7													
	17	69 01.5	41 25.2 28.3	343 36.6 36.3	54 20.9 05.5	95 27.2 18.7															
	18	84 04.0	56 24.8 N11 29.5	358 37.8 N25 36.4	69 22.9 N 5 05.8	110 29.4 S12 18.6	Vega	80 34.4 N38 48.0													
	19	99 06.4	71 24.5 30.7	13 39.0 36.4	84 24.8 06.0	125 31.6 18.5	Zuben'ubi	136 57.5 S16 08.3													
	20	114 08.9	86 24.1 31.9	28 40.2 36.4	99 26.7 06.2	140 33.8 18.4															
	21	129 11.4	101 23.7 . . 33.1	43 41.4 . . 36.4	114 28.6 . . 06.5	155 36.0 . . 18.4															
	22	144 13.8	116 23.3 34.2	58 42.6 36.4	129 30.5 06.7	170 38.2 18.3	Venus	334 19.5 14 14													
	23	159 16.3	131 23.0 35.4	73 43.8 36.4	144 32.5 06.9	185 40.4 18.2	Mars	275 26.8 18 07													
							Jupiter	345 41.6 13 26													
						Saturn	26 37.0 10 43														
Mer. Pass. 12 28.6														v −0.4 d 1.2		v 1.2 d 0.0		v 1.9 d 0.2		v 2.2 d 0.1	

UT	SUN		MOON							Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	v	Dec	d	HP	Naut.	Civil		14	15		16	17				
d	h																		
TUESDAY	14	00	177 39.5 S 2 43.5	284 12.9 7.1 S24 45.1 7.6 58.0					N 72	03 55	05 19	06 26							
	01	192 39.7 42.5	298 39.0 7.0 24 52.7 7.5 58.0					N 70	04 09	05 23	06 24								
	02	207 39.9 41.5	313 05.0 6.9 25 00.2 7.4 58.0					68	04 20	05 27	06 22								
	03	222 40.0 40.5	327 30.9 6.8 25 07.6 7.2 58.0					66	04 29	05 30	06 21								
	04	237 40.2 39.5	341 56.7 6.7 25 14.8 7.1 58.1					64	04 36	05 33	06 20	04 22							
	05	252 40.4 38.6	356 22.4 6.6 25 21.9 6.9 58.1					62	04 42	05 35	06 19	03 22	05 29	06 50	06 47				
	06	267 40.6 S 2 37.6	10 48.0 6.5 S25 28.8 6.8 58.1					60	04 48	05 36	06 18	02 49	04 28	05 38	06 09				
	07	282 40.7 36.6	25 13.5 6.4 25 35.6 6.6 58.1					N 58	04 52	05 38	06 17	02 24	03 54	05 03	05 42				
	08	297 40.9 35.6	39 38.9 6.3 25 42.2 6.4 58.2					56	04 56	05 39	06 16	02 04	03 29	04 37	05 21				
	09	312 41.1 34.6	54 04.2 6.2 25 48.6 6.4 58.2					54	04 59	05 40	06 16	01 48	03 10	04 16	05 04				
	10	327 41.2 33.6	68 29.4 6.1 25 55.0 6.1 58.2					52	05 02	05 41	06 15	01 34	02 53	03 59	04 49				
	11	342 41.4 32.6	82 54.5 5.9 26 01.1 6.0 58.3					50	05 05	05 42	06 14	01 22	02 39	03 44	04 35				
	12	357 41.6 S 2 31.6	97 19.4 5.9 S26 07.1 5.9 58.3					45	05 10	05 44	06 13	00 57	02 09	03 15	04 08				
	13	12 41.8 30.7	111 44.3 5.9 26 13.0 5.7 58.3					N 40	05 14	05 45	06 12	00 37	01 47	02 51	03 47				
	14	27 41.9 29.7	126 09.2 5.7 26 18.7 5.5 58.3					35	05 17	05 46	06 11	00 20	01 28	02 32	03 29				
	15	42 42.1 28.7	140 33.9 5.6 26 24.2 5.4 58.4					30	05 19	05 46	06 10	00 06	01 12	02 16	03 14				
	16	57 42.3 27.7	154 58.5 5.5 26 29.6 5.2 58.4					20	05 21	05 47	06 09	24 45	00 45	01 48	02 48				
	17	72 42.4 26.7	169 23.0 5.4 26 34.8 5.0 58.4					N 10	05 22	05 46	06 07	24 21	00 21	01 24	02 25				
	18	87 42.6 S 2 25.7	183 47.4 5.4 S26 39.8 4.9 58.4					0	05 21	05 45	06 06	24 00	00 00	01 01	02 04				
	19	102 42.8 24.7	198 11.8 5.3 26 44.7 4.7 58.5					S 10	05 19	05 43	06 04	23 38	24 39	00 39	01 43				
	20	117 43.0 23.8	212 36.1 5.1 26 49.4 4.6 58.5					20	05 15	05 40	06 02	23 15	24 15	00 15	01 20				
	21	132 43.1 22.8	227 00.2 5.1 26 54.0 4.4 58.5					30	05 08	05 36	06 00	22 49	23 48	24 54	00 54				
	22	147 43.3 21.8	241 24.3 5.0 26 58.4 4.2 58.5					35	05 04	05 33	05 59	22 33	23 31	24 38	00 38				
	23	162 43.5 20.8	255 48.3 5.0 27 02.6 4.0 58.6					40	04 58	05 30	05 57	22 15	23 12	24 20	00 20				
WEDNESDAY	15	00	177 43.7 S 2 19.8	270 12.3 4.8 S27 06.6 3.9 58.6				S 50	04 42	05 21	05 53	21 25	22 19	23 31	24 55				
	01	192 43.8 18.8	284 36.1 4.8 27 10.5 3.7 58.6					52	04 38	05 18	05 52	21 12	22 05	23 17	24 44				
	02	207 44.0 17.8	298 59.9 4.7 27 14.2 3.5 58.6					54	04 33	05 15	05 51	20 56	21 48	23 01	24 31				
	03	222 44.2 16.8	313 23.6 4.6 27 17.7 3.3 58.7					56	04 27	05 12	05 50	20 38	21 28	22 43	24 16				
	04	237 44.4 15.9	327 47.2 4.6 27 21.0 3.2 58.7					58	04 21	05 09	05 48	20 16	21 02	22 20	23 59				
	05	252 44.5 14.9	342 10.8 4.4 27 24.2 3.0 58.7					S 60	04 13	05 05	05 47	19 47	20 28	21 50	23 38				
	06	267 44.7 S 2 13.9	356 34.2 4.5 S27 27.2 2.8 58.7																
	07	282 44.9 12.9	10 57.7 4.3 27 30.0 2.7 58.8					Lat.	Sunset	Twilight		Moonset							
	08	297 45.0 11.9	25 21.0 4.3 27 32.7 2.4 58.8							Civil	Naut.	14	15	16	17				
	09	312 45.2 10.9	39 44.3 4.2 27 35.1 2.3 58.8																
	10	327 45.4 09.9	54 07.5 4.2 27 37.4 2.1 58.8																
	11	342 45.6 08.9	68 30.7 4.1 27 39.5 1.9 58.9					N 72	17 55	19 02	20 27								
	12	357 45.7 S 2 08.0	82 53.8 4.0 S27 41.4 1.7 58.9					N 70	17 56	18 57	20 12								
	13	12 45.9 07.0	97 16.8 4.0 27 43.1 1.5 58.9					68	17 58	18 53	20 01								
	14	27 46.1 06.0	111 39.8 3.9 27 44.6 1.4 58.9					66	17 59	18 50	19 51								
	15	42 46.3 05.0	126 02.7 3.9 27 46.0 1.1 59.0					64	18 00	18 47	19 44	05 59							
	16	57 46.4 04.0	140 25.6 3.9 27 47.1 1.0 59.0					62	18 01	18 45	19 38	06 59	06 56	07 45	10 00				
	17	72 46.6 03.0	154 48.5 3.8 27 48.1 0.8 59.0					60	18 01	18 43	19 32	07 33	07 57	08 57	10 37				
	18	87 46.8 S 2 02.0	169 11.3 3.7 S27 48.9 0.6 59.0					N 58	18 02	18 41	19 28	07 58	08 31	09 32	11 03				
	19	102 47.0 01.0	183 34.0 3.7 27 49.5 0.4 59.1					56	18 03	18 40	19 24	08 18	08 56	09 58	11 24				
	20	117 47.1 2 00.1	197 56.7 3.7 27 49.9 0.2 59.1					54	18 03	18 39	19 20	08 35	09 16	10 18	11 41				
	21	132 47.3 1 59.1	212 19.4 3.7 27 50.1 0.1 59.1					52	18 04	18 38	19 17	08 49	09 33	10 35	11 56				
	22	147 47.5 58.1	226 42.1 3.6 27 50.2 0.2 59.1					50	18 04	18 37	19 14	09 02	09 47	10 50	12 09				
	23	162 47.7 57.1	241 04.7 3.6 27 50.0 0.4 59.2					45	18 05	18 35	19 09	09 28	10 17	11 20	12 35				
THURSDAY	16	00	177 47.8 S 1 56.1	255 27.3 3.5 S27 49.6 0.5 59.2				N 40	18 06	18 33	19 05	09 49	10 40	11 43	12 55				
	01	192 48.0 55.1	269 49.8 3.5 27 49.1 0.7 59.2					35	18 07	18 33	19 02	10 06	10 59	12 02	13 13				
	02	207 48.2 54.1	284 12.3 3.5 27 48.4 1.0 59.2					30	18 08	18 32	19 00	10 21	11 15	12 18	13 27				
	03	222 48.4 53.1	298 34.8 3.5 27 47.4 1.1 59.3					20	18 09	18 31	18 57	10 46	11 43	12 46	13 52				
	04	237 48.6 52.2	312 57.3 3.5 27 46.3 1.3 59.3					N 10	18 11	18 32	18 56	11 08	12 07	13 09	14 14				
	05	252 48.7 51.2	327 19.8 3.4 27 45.0 1.5 59.3					0	18 12	18 33	18 57	11 29	12 29	13 31	14 34				
	06	267 48.9 S 1 50.2	341 42.2 3.5 S27 43.5 1.7 59.3					S 10	18 14	18 35	18 59	11 49	12 51	13 53	14 53				
	07	282 49.1 49.2	356 04.7 3.4 27 41.8 1.9 59.4					20	18 15	18 37	19 03	12 12	13 15	14 17	15 14				
	08	297 49.3 48.2	10 27.1 3.4 27 39.9 2.1 59.4					30	18 17	18 41	19 09	12 37	13 43	14 44	15 39				
	09	312 49.4 47.2	24 49.5 3.4 27 37.8 2.3 59.4					35	18 19	18 44	19 14	12 53	13 59	15 00	15 53				
	10	327 49.6 46.2	39 11.9 3.4 27 35.5 2.4 59.4					40	18 20	18 47	19 19	13 10	14 18	15 18	16 09				
	11	342 49.8 45.2	53 34.3 3.4 27 33.1 2.7 59.4					45	18 22	18 51	19 26	13 32	14 41	15 41	16 29				
	12	357 50.0 S 1 44.2	67 56.7 3.4 S27 30.4 2.9 59.5					S 50	18 24	18 56	19 35	13 59	15 10	16 09	16 53				
	13	12 50.1 43.3	82 19.1 3.4 27 27.5 3.0 59.5					52	18 25	18 59	19 39	14 12	15 25	16 23	17 04				
	14	27 50.3 42.3	96 41.5 3.4 27 24.5 3.3 59.5					54	18 26	19 01	19 44	14 27	15 42	16 39	17 17				
	15	42 50.5 41.3	111 03.9 3.4 27 21.2 3.4 59.5					56	18 27	19 04	19 49	14 45	16 02	16 58	17 32				
	16	57 50.7 40.3	125 26.3 3.5 27 17.8 3.6 59.6					58	18 28	19 08	19 55	15 07	16 27	17 21	17 50				
	17	72 50.8 39.3	139 48.8 3.4 27 14.2 3.9 59.6					S 60	18 30	19 12	20 03	15 35	17 01	17 51	18 12				
	18	87 51.0 S 1 38.3	154 11.2 3.5 S27 10.3 4.0 59.6																
	19	102 51.2 37.3	168 33.7 3.5 27 06.3 4.2 59.6					Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase				
	20	117 51.4 36.3	182 56.2 3.5 27 02.1 4.4 59.6						00 ^h	12 ^h	Pass.	Upper	Lower	d	%				
	21	132 51.6 35.4	197 18.7 3.5 26 57.7 4.6 59.7						d	m s									

UT		ARIES			VENUS -4.0			MARS +0.7			JUPITER -2.1			SATURN +0.9			STARS		
d h		GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	Name	SHA	Dec
		° /	'	° /	° /	'	° /	° /	'	° /	° /	'	° /	° /	'	° /	° /	'	° /
F R I D A Y	1700	174	18.7		146	22.6	N11 36.6	88	45.0	N25 36.4	159	34.4	N 5 07.1	200	42.6	S12 18.1	Acamar	315 13.2	S40 13.0
	01	189	21.2		161	22.2	37.8	103	46.2	36.4	174	36.3	07.4	215	44.8	18.0	Achernar	335 21.8	S57 07.4
	02	204	23.7		176	21.9	39.0	118	47.4	36.4	189	38.2	07.6	230	47.0	17.9	Acrux	173 01.1	S63 13.6
	03	219	26.1		191	21.5	40.2	133	48.6	36.4	204	40.1	07.8	245	49.1	17.8	Adhara	255 06.9	S29 00.4
	04	234	28.6		206	21.1	41.4	148	49.8	36.4	219	42.1	08.1	260	51.3	17.7	Aldebaran	290 41.4	N16 33.3
	05	249	31.1		221	20.8	42.5	163	51.0	36.4	234	44.0	08.3	275	53.5	17.6			
	06	264	33.5		236	20.4	N11 43.7	178	52.1	N25 36.5	249	45.9	N 5 08.5	290	55.7	S12 17.5	Alioth	166 13.7	N55 49.9
	07	279	36.0		251	20.0	44.9	193	53.3	36.5	264	47.8	08.8	305	57.9	17.4	Alkaid	152 52.8	N49 11.7
	08	294	38.5		266	19.7	46.1	208	54.5	36.5	279	49.7	09.0	321	00.1	17.3	Alnair	27 35.2	S46 51.0
	09	309	40.9		281	19.3	47.3	223	55.7	36.5	294	51.7	09.2	336	02.3	17.2	Alnilam	275 39.3	S 1 11.3
	10	324	43.4		296	18.9	48.5	238	56.9	36.5	309	53.6	09.4	351	04.5	17.1	Alphard	217 49.0	S 8 45.6
	11	339	45.9		311	18.5	49.6	253	58.1	36.5	324	55.5	09.7	6	06.7	17.0			
	12	354	48.3		326	18.2	N11 50.8	268	59.3	N25 36.5	339	57.4	N 5 09.9	21	08.9	S12 16.9	Alphecca	126 04.8	N26 38.0
	13	9	50.8		341	17.8	52.0	284	00.5	36.5	354	59.3	10.1	36	11.1	16.8	Alpheratz	357 36.7	N29 12.9
	14	24	53.2		356	17.4	53.2	299	01.7	36.5	10	01.3	10.4	51	13.2	16.7	Altair	62 01.6	N 8 55.5
	15	39	55.7		11	17.1	54.4	314	02.8	36.5	25	03.2	10.6	66	15.4	16.6	Ankaa	353 09.0	S42 11.0
	16	54	58.2		26	16.7	55.5	329	04.0	36.5	40	05.1	10.8	81	17.6	16.5	Antares	112 17.6	S26 29.0
	17	70	00.6		41	16.3	56.7	344	05.2	36.5	55	07.0	11.0	96	19.8	16.4			
	18	85	03.1		56	15.9	N11 57.9	359	06.4	N25 36.5	70	08.9	N 5 11.3	111	22.0	S12 16.3	Arcturus	145 49.0	N19 03.5
	19	100	05.6		71	15.6	11 59.1	14	07.6	36.5	85	10.9	11.5	126	24.2	16.2	Atria	107 13.1	S69 03.9
	20	115	08.0		86	15.2	12 00.2	29	08.8	36.5	100	12.8	11.7	141	26.4	16.1	Avior	234 15.0	S59 35.2
	21	130	10.5		101	14.8	01.4	44	10.0	36.5	115	14.7	12.0	156	28.6	16.0	Bellatrix	278 24.5	N 6 22.2
	22	145	13.0		116	14.4	02.6	59	11.1	36.5	130	16.6	12.2	171	30.8	15.9	Betelgeuse	270 53.7	N 7 24.6
	23	160	15.4		131	14.1	03.8	74	12.3	36.5	145	18.5	12.4	186	33.0	15.8			
S A T U R D A Y	1800	175	17.9		146	13.7	N12 05.0	89	13.5	N25 36.5	160	20.5	N 5 12.6	201	35.2	S12 15.7	Canopus	263 53.0	S52 42.7
	01	190	20.4		161	13.3	06.1	104	14.7	36.6	175	22.4	12.9	216	37.4	15.6	Capella	280 24.2	N46 01.4
	02	205	22.8		176	12.9	07.3	119	15.9	36.6	190	24.3	13.1	231	39.6	15.5	Deneb	49 27.1	N45 21.5
	03	220	25.3		191	12.6	08.5	134	17.1	36.6	205	26.2	13.3	246	41.7	15.5	Denebola	182 26.2	N14 26.5
	04	235	27.7		206	12.2	09.6	149	18.2	36.6	220	28.1	13.6	261	43.9	15.4	Diphda	348 49.1	S17 51.8
	05	250	30.2		221	11.8	10.8	164	19.4	36.6	235	30.1	13.8	276	46.1	15.3			
	06	265	32.7		236	11.4	N12 12.0	179	20.6	N25 36.6	250	32.0	N 5 14.0	291	48.3	S12 15.2	Dubhe	193 42.2	N61 37.6
	07	280	35.1		251	11.1	13.2	194	21.8	36.6	265	33.9	14.3	306	50.5	15.1	Elnath	278 03.8	N28 37.6
	08	295	37.6		266	10.7	14.3	209	23.0	36.6	280	35.8	14.5	321	52.7	15.0	Eltanin	90 42.9	N51 28.8
	09	310	40.1		281	10.3	15.5	224	24.2	36.6	295	37.7	14.7	336	54.9	14.9	Enif	33 40.5	N 9 58.7
	10	325	42.5		296	09.9	16.7	239	25.3	36.6	310	39.6	14.9	351	57.1	14.8	Fomalhaut	15 16.5	S29 30.1
	11	340	45.0		311	09.6	17.8	254	26.5	36.6	325	41.6	15.2	6	59.3	14.7			
	12	355	47.5		326	09.2	N12 19.0	269	27.7	N25 36.6	340	43.5	N 5 15.4	22	01.5	S12 14.6	Gacrux	171 52.8	S57 14.5
	13	10	49.9		341	08.8	20.2	284	28.9	36.6	355	45.4	15.6	37	03.7	14.5	Gienah	175 44.8	S17 40.3
	14	25	52.4		356	08.4	21.3	299	30.0	36.6	10	47.3	15.9	52	05.9	14.4	Hadar	148 37.6	S60 29.0
	15	40	54.8		11	08.0	22.5	314	31.2	36.6	25	49.2	16.1	67	08.1	14.3	Hamal	327 53.2	N23 34.2
	16	55	57.3		26	07.7	23.7	329	32.4	36.6	40	51.2	16.3	82	10.3	14.2	Kaus Aust.	83 34.6	S34 22.4
	17	70	59.8		41	07.3	24.8	344	33.6	36.6	55	53.1	16.5	97	12.4	14.1			
	18	86	02.2		56	06.9	N12 26.0	359	34.8	N25 36.6	70	55.0	N 5 16.8	112	14.6	S12 14.0	Kochab	137 18.9	N74 03.3
	19	101	04.7		71	06.5	27.2	14	35.9	36.6	85	56.9	17.0	127	16.8	13.9	Markab	13 31.7	N15 19.6
	20	116	07.2		86	06.1	28.3	29	37.1	36.6	100	58.8	17.2	142	19.0	13.8	Menkar	314 07.9	N 4 10.7
	21	131	09.6		101	05.8	29.5	44	38.3	36.6	116	00.7	17.5	157	21.2	13.7	Menkent	147 59.1	S36 29.0
	22	146	12.1		116	05.4	30.7	59	39.5	36.6	131	02.7	17.7	172	23.4	13.6	Miaplacidus	221 37.9	S69 48.9
	23	161	14.6		131	05.0	31.8	74	40.6	36.6	146	04.6	17.9	187	25.6	13.5			
S U N D A Y	1900	176	17.0		146	04.6	N12 33.0	89	41.8	N25 36.6	161	06.5	N 5 18.2	202	27.8	S12 13.4	Mirfak	308 30.7	N49 56.7
	01	191	19.5		161	04.2	34.2	104	43.0	36.6	176	08.4	18.4	217	30.0	13.3	Nunki	75 49.7	S26 16.1
	02	206	22.0		176	03.9	35.3	119	44.2	36.6	191	10.3	18.6	232	32.2	13.2	Peacock	53 08.4	S56 39.5
	03	221	24.4		191	03.5	36.5	134	45.3	36.6	206	12.3	18.8	247	34.4	13.1	Pollux	243 19.0	N27 58.2
	04	236	26.9		206	03.1	37.6	149	46.5	36.6	221	14.2	19.1	262	36.6	13.1	Procyon	244 52.3	N 5 09.9
	05	251	29.3		221	02.7	38.8	164	47.7	36.6	236	16.1	19.3	277	38.8	13.0			
	06	266	31.8		236	02.3	N12 40.0	179	48.9	N25 36.6	251	18.0	N 5 19.5	292	41.0	S12 12.9	Rasalhague	95 59.9	N12 32.4
	07	281	34.3		251	01.9	41.1	194	50.0	36.6	266	19.9	19.8	307	43.2	12.8	Regulus	207 35.7	N11 51.2
	08	296	36.7		266	01.6	42.3	209	51.2	36.6	281	21.8	20.0	322	45.4	12.7	Rigel	281 05.4	S 8 10.7
	09	311	39.2		281	01.2	43.4	224	52.4	36.6	296	23.8	20.2	337	47.5	12.6	Rigel Kent.	139 41.9	S60 55.7
	10	326	41.7		296	00.8	44.6	239	53.6	36.6	311	25.7	20.4	352	49.7	12.5	Sabik	102 04.5	S15 45.3
	11	341	44.1		311	00.4	45.8	254	54.7	36.6	326	27.6	20.7	7	51.9	12.4			
	12	356	46.6		326	00.0	N12 46.9	269	55.9	N25 36.6	341	29.5	N 5 20.9	22	54.1	S12 12.3	Schedar	349 33.3	N56 39.8
	13	11	49.1		340	59.6	48.1	284	57.1	36.6	356	31.4	21.1	37	56.3	12.2	Shaula	96 12.4	S37 07.1
	14	26	51.5		355	59.2	49.2	299	58.2	36.6	11	33.3	21.4	52	58.5	12.1	Sirius	258 27.5	S16 45.1
	15	41	54.0		10	58.9	50.4	314	59.4	36.6	26	35.3	21.6	68	00.7	12.0	Spica	158 23.6	S11 17.0
	16	56	56.5		25	58.5	51.5	330	00.6	36.6	41	37.2	21.8	83	02.9	11.9	Suhail	222 47.1	S43 31.7
	17	71	58.9		40	58.1	52.7	345	01.7	36.6	56	39.1	22.1	98	05.1	11.8			
	18	87	01.4		55	57.7	N12 53.9	0	02.9	N25 36.6	71	41.0	N 5 22.3	113	07.3	S12 11.7	Vega	80 34.3	N38 47.9

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	v	Dec		d	HP		Naut.	Civil		17	18	19	20					
	°	'			°	'											h	m	h	m	h
FRI DAY	d	h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	
	17 00	177	52.1	S	1	32.4	240	26.3	3.6	S26	43.4	5.2	59.7	03 36	05 03	06 10			09 14	07 43	
	01	192	52.3			31.4	254	48.9	3.7	26	38.2	5.4	59.8	04 06	05 14	06 10			08 16	07 24	
	02	207	52.4			30.4	269	11.6	3.6	26	32.8	5.5	59.8	04 16	05 18	06 09			07 41	07 08	
	03	222	52.6			29.4	283	34.2	3.7	26	27.3	5.7	59.8	04 25	05 22	06 09		07 55	07 16	06 56	
	04	237	52.8			28.4	297	56.9	3.8	26	21.6	6.0	59.8	04 32	05 25	06 09		07 12	06 56	06 45	
	05	252	53.0			27.4	312	19.7	3.8	26	15.6	6.1	59.8	04 38	05 27	06 09	06 47	06 43	06 40	06 36	
	06	267	53.2	S	1	26.5	326	42.5	3.8	S26	09.5	6.2	59.8	04 43	05 30	06 09	06 09	06 21	06 26	06 28	
	07	282	53.3			25.5	341	05.3	3.9	26	03.3	6.5	59.9	04 48	05 31	06 08	05 42	06 03	06 14	06 21	
	08	297	53.5			24.5	355	28.2	3.9	25	56.8	6.7	59.9	04 52	05 33	06 08	05 21	05 47	06 04	06 15	
	09	312	53.7			23.5	9	51.1	3.9	25	50.1	6.8	59.9	04 55	05 35	06 08	05 04	05 34	05 55	06 09	
	10	327	53.9			22.5	24	14.0	4.0	25	43.3	7.0	59.9	04 58	05 36	06 08	04 49	05 23	05 46	06 04	
	11	342	54.1			21.5	38	37.0	4.1	25	36.3	7.2	59.9	05 04	05 38	06 08	04 35	05 12	05 39	06 00	
	12	357	54.2	S	1	20.5	53	00.1	4.1	S25	29.1	7.4	60.0	05 09	05 40	06 07	04 08	04 51	05 23	05 50	
	13	12	54.4			19.5	67	23.2	4.2	25	21.7	7.6	60.0	05 12	05 42	06 07	03 29	04 18	04 59	05 34	
	14	27	54.6			18.5	81	46.4	4.2	25	14.1	7.7	60.0	05 15	05 43	06 07	03 14	04 05	04 49	05 28	
	15	42	54.8			17.6	96	09.6	4.3	25	06.4	7.9	60.0	05 19	05 44	06 06	02 48	03 43	04 32	05 17	
	16	57	54.9			16.6	110	32.9	4.4	24	58.5	8.1	60.0	05 20	05 45	06 06	02 25	03 23	04 17	05 07	
	17	72	55.1			15.6	124	56.3	4.4	24	50.4	8.3	60.0	05 20	05 44	06 05	02 04	03 05	04 03	04 58	
	18	87	55.3	S	1	14.6	139	19.7	4.5	S24	42.1	8.4	60.1	05 19	05 43	06 04	01 43	02 47	03 49	04 49	
	19	102	55.5			13.6	153	43.2	4.5	24	33.7	8.7	60.1	05 15	05 41	06 03	01 20	02 28	03 34	04 39	
	20	117	55.7			12.6	168	06.7	4.6	24	25.0	8.7	60.1	05 10	05 38	06 02	00 54	02 05	03 17	04 28	
	21	132	55.8			11.6	182	30.3	4.7	24	16.3	9.0	60.1	05 06	05 36	06 01	00 38	01 52	03 07	04 21	
	22	147	56.0			10.6	196	54.0	4.7	24	07.3	9.1	60.1	05 01	05 33	06 00	00 20	01 36	02 55	04 14	
	23	162	56.2			09.6	211	17.7	4.9	23	58.2	9.3	60.1	04 55	05 30	05 59	25 18	01 18	02 41	04 05	
SAT URDAY	18 00	177	56.4	S	1	08.7	225	41.6	4.8	S23	48.9	9.5	60.2	04 47	05 26	05 58	24 55	00 55	02 24	03 54	
	01	192	56.6			07.7	240	05.4	5.0	23	39.4	9.6	60.2	04 43	05 24	05 57	24 44	00 44	02 16	03 49	
	02	207	56.7			06.7	254	29.4	5.0	23	29.8	9.8	60.2	04 39	05 21	05 57	24 31	00 31	02 08	03 44	
	03	222	56.9			05.7	268	53.4	5.1	23	20.0	9.9	60.2	04 34	05 19	05 56	24 16	00 16	01 57	03 38	
	04	237	57.1			04.7	283	17.5	5.2	23	10.1	10.1	60.2	04 28	05 16	05 55	23 59	25 46	01 46	03 31	
	05	252	57.3			03.7	297	41.7	5.3	23	00.0	10.3	60.2	S 60	04 22	05 12	05 54	23 38	25 32	01 32	03 23
	06	267	57.5	S	1	02.7	312	06.0	5.3	S22	49.7	10.4	60.2	Lat.	Sunset	Twilight		Moonset			
	07	282	57.6			01.7	326	30.3	5.4	22	39.3	10.6	60.3			Civil	Naut.	17	18	19	20
	08	297	57.8	1	00.7		340	54.7	5.5	22	28.7	10.7	60.3	°	h m	h m	h m	h m	h m	h m	h m
	09	312	58.0	0	59.8		355	19.2	5.6	22	18.0	10.9	60.3								
	10	327	58.2			58.8	9	43.8	5.7	22	07.1	11.0	60.3	N 70	18 08	19 10	20 27			12 42	15 27
	11	342	58.4			57.8	24	08.5	5.7	21	56.1	11.2	60.3	68	18 09	19 04	20 13			13 15	15 40
	12	357	58.5	S	0	56.8	38	33.2	5.8	S21	44.9	11.3	60.3	66	18 09	19 00	20 03		11 00	13 39	15 50
	13	12	58.7			55.8	52	58.0	5.9	21	33.6	11.5	60.3	64	18 09	18 56	19 54		11 42	13 57	15 59
	14	27	58.9			54.8	67	22.9	6.0	21	22.1	11.6	60.3	62	18 09	18 53	19 46	10 00	12 10	14 12	16 07
	15	42	59.1			53.8	81	47.9	6.1	21	10.5	11.7	60.3	60	18 09	18 50	19 40	10 37	12 31	14 25	16 13
	16	57	59.3			52.8	96	13.0	6.2	20	58.8	11.9	60.3	N 58	18 09	18 48	19 35	11 03	12 49	14 36	16 19
	17	72	59.4			51.8	110	38.2	6.2	20	46.9	12.1	60.4	56	18 09	18 46	19 30	11 24	13 03	14 45	16 24
	18	87	59.6	S	0	50.8	125	03.4	6.3	S20	34.8	12.2	60.4	54	18 09	18 44	19 26	11 41	13 16	14 53	16 28
	19	102	59.8			49.9	139	28.7	6.5	20	22.6	12.3	60.4	52	18 09	18 43	19 23	11 56	13 27	15 00	16 32
	20	118	00.0			48.9	153	54.2	6.5	20	10.3	12.4	60.4	50	18 09	18 41	19 19	12 09	13 37	15 07	16 36
	21	133	00.2			47.9	168	19.7	6.5	19	57.9	12.6	60.4	45	18 09	18 39	19 13	12 35	13 57	15 21	16 44
	22	148	00.3			46.9	182	45.2	6.7	19	45.3	12.7	60.4	N 40	18 10	18 37	19 08	12 55	14 14	15 33	16 50
	23	163	00.5			45.9	197	10.9	6.8	19	32.6	12.8	60.4	35	18 10	18 35	19 04	13 13	14 27	15 42	16 56
	SUN DAY	19 00	178	00.7	S	0	44.9	211	36.7	6.8	S19	19.8	13.0	60.4	30	18 10	18 34	19 02	13 27	14 39	15 51
01		193	00.9			43.9	226	02.5	6.9	19	06.8	13.0	60.4	20	18 10	18 32	18 58	13 52	15 00	16 05	17 09
02		208	01.1			42.9	240	28.4	7.1	18	53.8	13.2	60.4	N 10	18 11	18 32	18 56	14 14	15 17	16 18	17 16
03		223	01.3			41.9	254	54.5	7.1	18	40.6	13.4	60.4	0	18 11	18 32	18 56	14 34	15 33	16 30	17 23
04		238	01.4			41.0	269	20.6	7.2	18	27.2	13.4	60.4	S 10	18 12	18 33	18 57	14 53	15 50	16 41	17 29
05		253	01.6			40.0	283	46.8	7.2	18	13.8	13.6	60.4	20	18 13	18 35	19 00	15 14	16 07	16 54	17 36
06		268	01.8	S	0	39.0	298	13.0	7.4	S18	00.2	13.6	60.4	30	18 14	18 38	19 06	15 39	16 26	17 07	17 44
07		283	02.0			38.0	312	39.4	7.4	17	46.6	13.8	60.4	35	18 14	18 40	19 09	15 53	16 38	17 15	17 48
08		298	02.2			37.0	327	05.8	7.6	17	32.8	13.9	60.4	40	18 15	18 42	19 14	16 09	16 51	17 25	17 54
09		313	02.3			36.0	341	32.4	7.6	17	18.9	14.0	60.4	45	18 16	18 45	19 20	16 29	17 06	17 35	17 59
10		328	02.5			35.0	355	59.0	7.7	17	04.9	14.1	60.5	S 50	18 17	18 49	19 28	16 53	17 24	17 48	18 06
11		343	02.7			34.0	10	25.7	7.8	16	50.8	14.2	60.5	52	18 18	18 51	19 31	17 04	17 33	17 54	18 09
12		358	02.9	S	0	33.0	24	52.5	7.9	S16	36.6	14.4	60.5	54	18 18	18 54	19 36	17 17	17 43	18 00	18 13
13		13	03.1			32.1	39	19.4	7.9	16	22.2	14.4	60.5	56	18 19	18 56	19 41	17 32	17 54	18 07	18 17
14		28	03.3			31.1	53	46.3	8.1	16	07.8	14.5	60.5	58	18 20	18 59	19 46	17 50	18 06	18 15	18 21
15		43																			

UT		ARIES	VENUS -4.0		MARS +0.8		JUPITER -2.1		SATURN +0.9		STARS			
		GHA ° ' "	GHA ° ' "	Dec ° ' "	GHA ° ' "	Dec ° ' "	GHA ° ' "	Dec ° ' "	GHA ° ' "	Dec ° ' "	Name	SHA ° ' "	Dec ° ' "	
20	00	177 16.2	145 55.4	N13 00.8	90 09.9	N25 36.6	161 52.5	N 5 23.7	203 20.5	S12 11.1	Acamar	315 13.2	S40 13.0	
	01	192 18.6	160 55.0	01.9	105 11.1	36.6	176 54.4	23.9	218 22.7	11.0	Achernar	335 21.8	S57 07.4	
	02	207 21.1	175 54.6	03.1	120 12.3	36.5	191 56.4	24.1	233 24.9	10.9	Acrux	173 01.1	S63 13.6	
	03	222 23.6	190 54.2	.. 04.2	135 13.4	.. 36.5	206 58.3	.. 24.3	248 27.1	.. 10.9	Adhara	255 07.0	S29 00.4	
	04	237 26.0	205 53.8	05.4	150 14.6	36.5	222 00.2	24.6	263 29.2	10.8	Aldebaran	290 41.5	N16 33.3	
	05	252 28.5	220 53.4	06.5	165 15.8	36.5	237 02.1	24.8	278 31.4	10.7				
	06	267 30.9	235 53.0	N13 07.7	180 16.9	N25 36.5	252 04.0	N 5 25.0	293 33.6	S12 10.6	Alioth	166 13.7	N55 49.9	
	07	282 33.4	250 52.6	08.8	195 18.1	36.5	267 05.9	25.3	308 35.8	10.5	Alkaid	152 52.7	N49 11.7	
	08	297 35.9	265 52.3	10.0	210 19.3	36.5	282 07.8	25.5	323 38.0	10.4	Alnair	27 35.2	S46 51.0	
	09	312 38.3	280 51.9	.. 11.1	225 20.4	.. 36.5	297 09.8	.. 25.7	338 40.2	.. 10.3	Alnilam	275 39.3	S 1 11.3	
	10	327 40.8	295 51.5	12.2	240 21.6	36.5	312 11.7	26.0	353 42.4	10.2	Alphard	217 49.0	S 8 45.6	
	11	342 43.3	310 51.1	13.4	255 22.7	36.5	327 13.6	26.2	8 44.6	10.1				
	12	357 45.7	325 50.7	N13 14.5	270 23.9	N25 36.5	342 15.5	N 5 26.4	23 46.8	S12 10.0	Alphecca	126 04.8	N26 38.0	
	13	12 48.2	340 50.3	15.7	285 25.1	36.5	357 17.4	26.6	38 49.0	09.9	Alpheratz	357 36.7	N29 12.9	
	14	27 50.7	355 49.9	16.8	300 26.2	36.5	12 19.3	26.9	53 51.2	09.8	Altair	62 01.6	N 8 55.5	
	15	42 53.1	10 49.5	.. 18.0	315 27.4	.. 36.5	27 21.3	.. 27.1	68 53.4	.. 09.7	Ankaa	353 09.0	S42 11.0	
	16	57 55.6	25 49.1	19.1	330 28.6	36.5	42 23.2	27.3	83 55.6	09.6	Antares	112 17.5	S26 29.0	
	17	72 58.1	40 48.7	20.2	345 29.7	36.5	57 25.1	27.6	98 57.8	09.5				
	18	88 00.5	55 48.3	N13 21.4	0 30.9	N25 36.5	72 27.0	N 5 27.8	114 00.0	S12 09.4	Arcturus	145 49.0	N19 03.5	
	19	103 03.0	70 47.9	22.5	15 32.0	36.5	87 28.9	28.0	129 02.2	09.3	Atria	107 13.0	S69 03.9	
	20	118 05.4	85 47.5	23.7	30 33.2	36.4	102 30.8	28.3	144 04.4	09.2	Avior	234 15.0	S59 35.2	
	21	133 07.9	100 47.1	.. 24.8	45 34.4	.. 36.4	117 32.8	.. 28.5	159 06.6	.. 09.1	Bellatrix	278 24.5	N 6 22.2	
	22	148 10.4	115 46.8	26.0	60 35.5	36.4	132 34.7	28.7	174 08.8	09.0	Betelgeuse	270 53.7	N 7 24.6	
	23	163 12.8	130 46.4	27.1	75 36.7	36.4	147 36.6	28.9	189 11.0	09.0				
21	00	178 15.3	145 46.0	N13 28.2	90 37.8	N25 36.4	162 38.5	N 5 29.2	204 13.2	S12 08.9	Canopus	263 53.0	S52 42.7	
	01	193 17.8	160 45.6	29.4	105 39.0	36.4	177 40.4	29.4	219 15.4	08.8	Capella	280 24.2	N46 01.4	
	02	208 20.2	175 45.2	30.5	120 40.1	36.4	192 42.3	29.6	234 17.6	08.7	Deneb	49 27.1	N45 21.4	
	03	223 22.7	190 44.8	.. 31.6	135 41.3	.. 36.4	207 44.2	.. 29.9	249 19.8	.. 08.6	Denebola	182 26.2	N14 26.5	
	04	238 25.2	205 44.4	32.8	150 42.5	36.4	222 46.2	30.1	264 22.0	08.5	Diphda	348 49.1	S17 51.8	
	05	253 27.6	220 44.0	33.9	165 43.6	36.4	237 48.1	30.3	279 24.1	08.4				
	06	268 30.1	235 43.6	N13 35.0	180 44.8	N25 36.4	252 50.0	N 5 30.5	294 26.3	S12 08.3	Dubhe	193 42.2	N61 37.6	
	07	283 32.5	250 43.2	36.2	195 45.9	36.4	267 51.9	30.8	309 28.5	08.2	Elnath	278 03.8	N28 37.6	
	08	298 35.0	265 42.8	37.3	210 47.1	36.4	282 53.8	31.0	324 30.7	08.1	Eltanin	90 42.9	N51 28.8	
	09	313 37.5	280 42.4	.. 38.4	225 48.2	.. 36.3	297 55.7	.. 31.2	339 32.9	.. 08.0	Enif	33 40.5	N 9 58.7	
	10	328 39.9	295 42.0	39.6	240 49.4	36.3	312 57.7	31.5	354 35.1	07.9	Fomalhaut	15 16.5	S29 30.1	
	11	343 42.4	310 41.6	40.7	255 50.6	36.3	327 59.6	31.7	9 37.3	07.8				
	12	358 44.9	325 41.2	N13 41.8	270 51.7	N25 36.3	343 01.5	N 5 31.9	24 39.5	S12 07.7	Gacrux	171 52.8	S57 14.6	
	13	13 47.3	340 40.8	43.0	285 52.9	36.3	358 03.4	32.2	39 41.7	07.6	Gienah	175 44.8	S17 40.3	
	14	28 49.8	355 40.4	44.1	300 54.0	36.3	13 05.3	32.4	54 43.9	07.5	Hadar	148 37.6	S60 29.0	
	15	43 52.3	10 40.0	.. 45.2	315 55.2	.. 36.3	28 07.2	.. 32.6	69 46.1	.. 07.4	Hamal	327 53.2	N23 34.2	
	16	58 54.7	25 39.6	46.4	330 56.3	36.3	43 09.1	32.8	84 48.3	07.3	Kaus Aust.	83 34.5	S34 22.4	
	17	73 57.2	40 39.2	47.5	345 57.5	36.3	58 11.1	33.1	99 50.5	07.2				
	18	88 59.7	55 38.8	N13 48.6	0 58.6	N25 36.3	73 13.0	N 5 33.3	114 52.7	S12 07.2	Kochab	137 18.9	N74 03.3	
	19	104 02.1	70 38.4	49.7	15 59.8	36.2	88 14.9	33.5	129 54.9	07.1	Markab	13 31.7	N15 19.6	
	20	119 04.6	85 38.0	50.9	31 00.9	36.2	103 16.8	33.8	144 57.1	07.0	Menkar	314 07.9	N 4 10.7	
	21	134 07.0	100 37.6	.. 52.0	46 02.1	.. 36.2	118 18.7	.. 34.0	159 59.3	.. 06.9	Menkent	147 59.1	S36 29.0	
	22	149 09.5	115 37.2	53.1	61 03.2	36.2	133 20.6	34.2	175 01.5	06.8	Miaplacidus	221 37.9	S69 48.9	
	23	164 12.0	130 36.8	54.3	76 04.4	36.2	148 22.5	34.5	190 03.7	06.7				
22	00	179 14.4	145 36.4	N13 55.4	91 05.5	N25 36.2	163 24.5	N 5 34.7	205 05.9	S12 06.6	Mirfak	308 30.7	N49 56.7	
	01	194 16.9	160 36.0	56.5	106 06.7	36.2	178 26.4	34.9	220 08.1	06.5	Nunki	75 49.7	S26 16.1	
	02	209 19.4	175 35.6	57.6	121 07.8	36.2	193 28.3	35.1	235 10.3	06.4	Peacock	53 08.4	S56 39.5	
	03	224 21.8	190 35.2	.. 58.7	136 09.0	.. 36.1	208 30.2	.. 35.4	250 12.5	.. 06.3	Pollux	243 19.0	N27 58.3	
	04	239 24.3	205 34.8	13 59.9	151 10.1	36.1	223 32.1	35.6	265 14.7	06.2	Procyon	244 52.3	N 5 09.9	
	05	254 26.8	220 34.3	14 01.0	166 11.3	36.1	238 34.0	35.8	280 16.9	06.1				
	06	269 29.2	235 33.9	N14 02.1	181 12.4	N25 36.1	253 35.9	N 5 36.1	295 19.1	S12 06.0	Rasalhague	95 59.9	N12 32.4	
	07	284 31.7	250 33.5	03.2	196 13.6	36.1	268 37.9	36.3	310 21.3	05.9	Regulus	207 35.8	N11 51.2	
	08	299 34.1	265 33.1	04.4	211 14.7	36.1	283 39.8	36.5	325 23.5	05.8	Rigel	281 05.4	S 8 10.6	
	09	314 36.6	280 32.7	.. 05.5	226 15.9	.. 36.1	298 41.7	.. 36.8	340 25.7	.. 05.7	Rigil Kent.	139 41.9	S60 55.7	
	10	329 39.1	295 32.3	06.6	241 17.0	36.1	313 43.6	37.0	355 27.9	05.6	Sabik	102 04.4	S15 45.3	
	11	344 41.5	310 31.9	07.7	256 18.2	36.0	328 45.5	37.2	10 30.1	05.5				
	12	359 44.0	325 31.5	N14 08.8	271 19.3	N25 36.0	343 47.4	N 5 37.4	25 32.3	S12 05.5	Schedar	349 33.3	N56 39.8	
	13	14 46.5	340 31.1	09.9	286 20.5	36.0	358 49.3	37.7	40 34.5	05.4	Shaula	96 12.4	S37 07.2	
	14	29 48.9	355 30.7	11.1	301 21.6	36.0	13 51.2	37.9	55 36.7	05.3	Sirius	258 27.5	S16 45.0	
	15	44 51.4	10 30.3	.. 12.2	316 22.8	.. 36.0	28 53.2	.. 38.1	70 38.9	.. 05.2	Spica	158 23.6	S11 17.0	
	16	59 53.9	25 29.9	13.3	331 23.9	36.0	43 55.1	38.4	85 41.1	05.1	Suhail	222 47.1	S43 31.7	
	17	74 56.3	40 29.5	14.4	346 25.1	36.0	58 57.0	38.6	100 43.3	05.0				
	18	89 58.8	55 29.1	N14 15.5	1 26.2	N25 35.9	73 58.9	N 5 38.8	115 45.5	S12 04.9	Vega	80 34.3	N38 47.9	
	19	105 01.3	70 28.6	16.6	16 27.4	35.9	89 00.8	39.0	130 47.7	04.8	Zuben'ubi	136 57.4	S16 08.3	
	20	120 03.7	85 28.2	17.8	31 28.5	35.9	104 02.7	39.3	145 49.9	04.7				
	21	135 06.2	100 27.8	.. 18.9	46 29.6	.. 35.9	119 04.6	.. 39.5	160 52.1	.. 04.6				
	22	150 08.6	115 27.4	20.0	61 30.8	35.9	134 06.6	39.7	175 54.3	04.5	Venus	327 30.7	14 17	
	23	165 11.1	130 27.0	21.1	76 31.9	35.9	149 08.5	40.0	190 56.5	04.4	Mars	272 22.5	17 56	
h m												Jupiter	344 23.2	13 08
Mer.Pass. 12 05.0			v -0.4	d 1.1		v 1.2	d 0.0	v 1.9	d 0.2	v 2.2	d 0.1	Saturn	25 57.9	10 22

UT	SUN			MOON				Lat.	Twilight		Sunrise	Moonrise																		
	GHA	Dec		GHA	r	Dec	d		HP	Naut.		Civil	20	21	22	23														
d	h	m	s	°	'	"	°	'	"	h	m	h	m	h	m	h	m													
MONDAY	00	178	05.1	S	0	21.2	198	20.4	8.9	S13	38.5	15.4	60.4	N	72	03	17	04	47	05	55	07	43	06	59	06	23	05	46	
	01	193	05.3			20.2	212	48.3	8.9	13	23.1	15.5	60.4	N	70	03	36	04	55	05	56	07	24	06	51	06	24	05	57	
	02	208	05.4			19.2	227	16.2	9.0	13	07.6	15.5	60.4	68	03	51	05	01	05	57	07	08	06	45	06	25	06	05		
	03	223	05.6			18.2	241	44.2	9.1	12	52.1	15.6	60.4	66	04	03	05	07	05	58	06	56	06	40	06	27	06	13		
	04	238	05.8			17.2	256	12.3	9.1	12	36.5	15.7	60.4	64	04	13	05	11	05	59	06	45	06	36	06	28	06	19		
	05	253	06.0			16.2	270	40.4	9.2	12	20.8	15.8	60.4	62	04	21	05	15	05	59	06	36	06	32	06	28	06	25		
	06	268	06.2	S	0	15.2	285	08.6	9.3	S12	05.0	15.8	60.4	60	04	28	05	18	06	00	06	28	06	29	06	29	06	30		
	07	283	06.4			14.3	299	36.9	9.4	11	49.2	15.9	60.4	N	58	04	34	05	21	06	00	06	21	06	26	06	30	06	34	
	08	298	06.5			13.3	314	05.3	9.5	11	33.3	16.0	60.4	56	04	39	05	23	06	00	06	15	06	23	06	30	06	38		
	09	313	06.7			12.3	328	33.8	9.5	11	17.3	16.0	60.4	54	04	44	05	26	06	01	06	09	06	21	06	31	06	41		
	10	328	06.9			11.3	343	02.3	9.5	11	01.3	16.1	60.4	52	04	48	05	28	06	01	06	04	06	19	06	31	06	44		
	11	343	07.1			10.3	357	30.8	9.7	10	45.2	16.1	60.4	50	04	51	05	29	06	01	06	00	06	17	06	32	06	47		
	12	358	07.3	S	0	09.3	11	59.5	9.7	S10	29.1	16.2	60.4	45	04	58	05	33	06	02	05	50	06	12	06	33	06	53		
	13	13	07.5			08.3	26	28.2	9.8	10	12.9	16.3	60.4	N	40	05	04	05	35	06	02	05	41	06	09	06	34	06	59	
	14	28	07.6			07.3	40	57.0	9.9	9	56.6	16.3	60.3	35	05	08	05	38	06	03	05	34	06	05	06	35	07	03		
	15	43	07.8			06.3	55	25.9	9.9	9	40.3	16.3	60.3	30	05	11	05	39	06	03	05	28	06	03	06	35	07	07		
	16	58	08.0			05.4	69	54.8	9.9	9	24.0	16.4	60.3	20	05	16	05	42	06	04	05	17	05	58	06	36	07	15		
	17	73	08.2			04.4	84	23.7	10.1	9	07.6	16.5	60.3	N	10	05	18	05	43	06	04	05	07	05	53	06	37	07	21	
	18	88	08.4	S	0	03.4	98	52.8	10.1	S	8	51.1	16.5	60.3	0	05	19	05	43	06	04	04	58	05	49	06	38	07	27	
	19	103	08.6			02.4	113	21.9	10.2	8	34.6	16.5	60.3	S	10	05	19	05	43	06	04	04	49	05	45	06	40	07	33	
	20	118	08.7			01.4	127	51.1	10.2	8	18.1	16.6	60.3	20	05	16	05	42	06	04	04	39	05	41	06	41	07	39		
	21	133	08.9	S		00.4	142	20.3	10.3	8	01.5	16.6	60.3	30	05	12	05	40	06	04	04	28	05	36	06	42	07	47		
	22	148	09.1	N		00.6	156	49.6	10.3	7	44.9	16.6	60.3	35	05	09	05	38	06	04	04	21	05	33	06	43	07	51		
	23	163	09.3			01.6	171	18.9	10.4	7	28.3	16.7	60.2	40	05	05	05	36	06	03	04	14	05	30	06	44	07	56		
	TUESDAY	00	178	09.5	N	0	02.6	185	48.3	10.4	S	7	11.6	16.7	50	04	52	05	31	06	03	03	54	05	21	06	46	08	09	
01		193	09.7			03.5	200	17.7	10.6	6	54.9	16.7	60.2	52	04	49	05	29	06	03	03	49	05	19	06	47	08	12		
02		208	09.8			04.5	214	47.3	10.5	6	38.2	16.8	60.2	54	04	45	05	27	06	02	03	44	05	17	06	47	08	16		
03		223	10.0			05.5	229	16.8	10.6	6	21.4	16.8	60.2	56	04	41	05	25	06	02	03	38	05	14	06	48	08	20		
04		238	10.2			06.5	243	46.4	10.7	6	04.6	16.8	60.2	58	04	36	05	23	06	02	03	31	05	12	06	49	08	24		
05		253	10.4			07.5	258	16.1	10.7	5	47.8	16.9	60.1	S	60	04	30	05	20	06	02	03	23	05	08	06	50	08	29	
06		268	10.6	N	0	08.5	272	45.8	10.8	S	5	30.9	16.8	60.1	Lat.		Sunset		Twilight		Moonset									
07		283	10.8			09.5	287	15.6	10.8	5	14.1	16.9	60.1					Civil		Naut.	20	21	22	23						
08		298	11.0			10.5	301	45.4	10.8	4	57.2	16.9	60.1																	
09		313	11.1			11.5	316	15.2	10.9	4	40.3	16.9	60.1																	
10		328	11.3			12.4	330	45.1	11.0	4	23.4	16.9	60.1																	
11		343	11.5			13.4	345	15.1	11.0	4	06.5	17.0	60.0	N	72	18	22	19	31	21	03	15	10	17	43	20	07	22	38	
12		358	11.7	N	0	14.4	359	45.1	11.0	S	3	49.5	16.9	60.0	N	70	18	21	19	23	20	42	15	27	17	46	19	59	22	16
13		13	11.9			15.4	14	15.1	11.1	3	32.6	17.0	60.0	68	18	19	19	16	20	27	15	40	17	49	19	53	21	59		
14		28	12.1			16.4	28	45.2	11.1	3	15.6	17.0	60.0	66	18	18	19	10	20	14	15	50	17	52	19	48	21	45		
15		43	12.2			17.4	43	15.3	11.1	2	58.6	16.9	60.0	64	18	18	19	05	20	04	15	59	17	54	19	44	21	34		
16		58	12.4			18.4	57	45.4	11.2	2	41.7	17.0	59.9	62	18	17	19	01	19	55	16	07	17	55	19	40	21	25		
17		73	12.6			19.4	72	15.6	11.2	2	24.7	17.0	59.9	60	18	16	18	58	19	48	16	13	17	57	19	37	21	16		
18		88	12.8	N	0	20.3	86	45.8	11.3	S	2	07.7	16.9	59.9	N	58	18	16	18	55	19	42	16	19	17	58	19	34	21	09
19		103	13.0			21.3	101	16.1	11.3	1	50.8	17.0	59.9	56	18	15	18	52	19	37	16	24	17	59	19	32	21	03		
20		118	13.2			22.3	115	46.4	11.3	1	33.8	17.0	59.9	54	18	15	18	50	19	32	16	28	18	00	19	30	20	58		
21		133	13.4			23.3	130	16.7	11.3	1	16.8	16.9	59.8	52	18	14	18	48	19	28	16	32	18	01	19	28	20	53		
22		148	13.5			24.3	144	47.0	11.4	0	59.9	17.0	59.8	50	18	14	18	46	19	24	16	36	18	02	19	26	20	48		
23		163	13.7			25.3	159	17.4	11.4	0	42.9	16.9	59.8	45	18	13	18	43	19	17	16	44	18	04	19	22	20	39		
WEDNESDAY		00	178	13.9	N	0	26.3	173	47.8	11.5	S	0	26.0	17.0	40	18	13	18	40	19	11	16	50	18	05	19	18	20	31	
	01	193	14.1			27.3	188	18.3	11.5	S	0	09.0	16.9	35	18	12	18	37	19	07	16	56	18	07	19	16	20	24		
	02	208	14.3			28.2	202	48.8	11.5	N	0	07.9	16.9	30	18	12	18	36	19	04	17	00	18	08	19	13	20	18		
	03	223	14.5			29.2	217	19.3	11.5	0	24.8	16.9	59.7	20	18	11	18	33	18	59	17	09	18	10	19	09	20	07		
	04	238	14.6			30.2	231	49.8	11.5	0	41.7	16.9	59.7	N	10	18	11	18	32	18	56	17	16	18	11	19	05	19	58	
	05	253	14.8			31.2	246	20.3	11.6	0	58.6	16.8	59.6	0	18	10	18	31	18	55	17	23	18	13	19	01	19	50		
	06</																													

UT		ARIES			VENUS -4.0			MARS +0.8			JUPITER -2.1			SATURN +0.9			STARS		
		GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	Name	SHA	Dec
d h		° /		° /	° /		° /	° /		° /	° /		° /	° /		° /		° /	° /
23	00	180	13.6	145 26.6 N14 22.2	91 33.1 N25 35.8	164 10.4 N 5 40.2	205 58.7 S12 04.3	Acamar	315 13.2 S40 12.9										
	01	195	16.0	160 26.2 23.3	106 34.2 35.8	179 12.3 40.4	221 00.9 04.2	Achernar	335 21.8 S57 07.3										
	02	210	18.5	175 25.8 24.4	121 35.4 35.8	194 14.2 40.7	236 03.1 04.1	Acruhs	173 01.1 S63 13.7										
	03	225	21.0	190 25.4 . . 25.5	136 36.5 . . 35.8	209 16.1 . . 40.9	251 05.3 . . 04.0	Adhara	255 07.0 S29 00.4										
	04	240	23.4	205 24.9 26.6	151 37.6 35.8	224 18.0 41.1	266 07.5 04.0	Aldebaran	290 41.5 N16 33.3										
	05	255	25.9	220 24.5 27.7	166 38.8 35.8	239 19.9 41.3	281 09.7 03.9												
	06	270	28.4	235 24.1 N14 28.9	181 39.9 N25 35.7	254 21.9 N 5 41.6	296 11.9 S12 03.8	Alioth	166 13.7 N55 50.0										
	07	285	30.8	250 23.7 30.0	196 41.1 35.7	269 23.8 41.8	311 14.1 03.7	Alkaid	152 52.7 N49 11.7										
	08	300	33.3	265 23.3 31.1	211 42.2 35.7	284 25.7 42.0	326 16.3 03.6	Alnair	27 35.2 S46 50.9										
	09	315	35.8	280 22.9 . . 32.2	226 43.3 . . 35.7	299 27.6 . . 42.3	341 18.5 . . 03.5	Alnilam	275 39.3 S 1 11.3										
	10	330	38.2	295 22.5 33.3	241 44.5 35.7	314 29.5 42.5	356 20.7 03.4	Alphard	217 49.0 S 8 45.7										
	11	345	40.7	310 22.1 34.4	256 45.6 35.7	329 31.4 42.7	11 22.9 03.3												
	12	0	43.1	325 21.6 N14 35.5	271 46.8 N25 35.6	344 33.3 N 5 43.0	26 25.1 S12 03.2	Alphecca	126 04.8 N26 38.0										
	13	15	45.6	340 21.2 36.6	286 47.9 35.6	359 35.2 43.2	41 27.3 03.1	Alpheratz	357 36.7 N29 12.9										
	14	30	48.1	355 20.8 37.7	301 49.0 35.6	14 37.2 43.4	56 29.5 03.0	Altair	62 01.5 N 8 55.5										
	15	45	50.5	10 20.4 . . 38.8	316 50.2 . . 35.6	29 39.1 . . 43.6	71 31.7 . . 02.9	Ankaa	353 09.0 S42 11.0										
	16	60	53.0	25 20.0 39.9	331 51.3 35.6	44 41.0 43.9	86 33.9 02.8	Antares	112 17.5 S26 29.0										
	17	75	55.5	40 19.6 41.0	346 52.5 35.5	59 42.9 44.1	101 36.1 02.7												
	18	90	57.9	55 19.1 N14 42.1	1 53.6 N25 35.5	74 44.8 N 5 44.3	116 38.3 S12 02.6	Arcturus	145 49.0 N19 03.5										
	19	106	00.4	70 18.7 43.2	16 54.7 35.5	89 46.7 44.6	131 40.5 02.5	Atria	107 13.0 S69 03.9										
	20	121	02.9	85 18.3 44.3	31 55.9 35.5	104 48.6 44.8	146 42.7 02.5	Avior	234 15.0 S59 35.2										
	21	136	05.3	100 17.9 . . 45.4	46 57.0 . . 35.5	119 50.5 . . 45.0	161 44.9 . . 02.4	Bellatrix	278 24.6 N 6 22.2										
	22	151	07.8	115 17.5 46.5	61 58.1 35.4	134 52.5 45.3	176 47.1 02.3	Betelgeuse	270 53.7 N 7 24.6										
	23	166	10.2	130 17.1 47.6	76 59.3 35.4	149 54.4 45.5	191 49.3 02.2												
24	00	181	12.7	145 16.6 N14 48.7	92 00.4 N25 35.4	164 56.3 N 5 45.7	206 51.5 S12 02.1	Canopus	263 53.0 S52 42.7										
	01	196	15.2	160 16.2 49.8	107 01.5 35.4	179 58.2 45.9	221 53.7 02.0	Capella	280 24.2 N46 01.4										
	02	211	17.6	175 15.8 50.9	122 02.7 35.4	195 00.1 46.2	236 55.9 01.9	Deneb	49 27.1 N45 21.4										
	03	226	20.1	190 15.4 . . 52.0	137 03.8 . . 35.3	210 02.0 . . 46.4	251 58.1 . . 01.8	Denebola	182 26.2 N14 26.5										
	04	241	22.6	205 15.0 53.1	152 05.0 35.3	225 03.9 46.6	267 00.3 01.7	Diphda	348 49.1 S17 51.8										
	05	256	25.0	220 14.5 54.2	167 06.1 35.3	240 05.8 46.9	282 02.5 01.6												
	06	271	27.5	235 14.1 N14 55.3	182 07.2 N25 35.3	255 07.7 N 5 47.1	297 04.7 S12 01.5	Dubhe	193 42.2 N61 37.6										
	07	286	30.0	250 13.7 56.3	197 08.4 35.3	270 09.7 47.3	312 06.9 01.4	Elnath	278 03.8 N28 37.6										
	08	301	32.4	265 13.3 57.4	212 09.5 35.2	285 11.6 47.6	327 09.1 01.3	Eltanin	90 42.8 N51 28.8										
	09	316	34.9	280 12.8 . . 58.5	227 10.6 . . 35.2	300 13.5 . . 47.8	342 11.3 . . 01.2	Enif	33 40.5 N 9 58.7										
	10	331	37.4	295 12.4 14 59.6	242 11.8 35.2	315 15.4 48.0	357 13.5 01.1	Fomalhaut	15 16.5 S29 30.1										
	11	346	39.8	310 12.0 15 00.7	257 12.9 35.2	330 17.3 48.2	12 15.7 01.1												
	12	1	42.3	325 11.6 N15 01.8	272 14.0 N25 35.1	345 19.2 N 5 48.5	27 17.9 S12 01.0	Gacrux	171 52.8 S57 14.6										
	13	16	44.7	340 11.2 02.9	287 15.1 35.1	0 21.1 48.7	42 20.1 00.9	Gienah	175 44.8 S17 40.3										
	14	31	47.2	355 10.7 04.0	302 16.3 35.1	15 23.0 48.9	57 22.3 00.8	Hadar	148 37.6 S60 29.0										
	15	46	49.7	10 10.3 . . 05.1	317 17.4 . . 35.1	30 24.9 . . 49.2	72 24.5 . . 00.7	Hamal	327 53.2 N23 34.2										
	16	61	52.1	25 09.9 06.2	332 18.5 35.1	45 26.9 49.4	87 26.7 00.6	Kaus Aust.	83 34.5 S34 22.4										
	17	76	54.6	40 09.5 07.2	347 19.7 35.0	60 28.8 49.6	102 28.9 00.5												
	18	91	57.1	55 09.0 N15 08.3	2 20.8 N25 35.0	75 30.7 N 5 49.8	117 31.1 S12 00.4	Kochab	137 18.8 N74 03.4										
	19	106	59.5	70 08.6 09.4	17 21.9 35.0	90 32.6 50.1	132 33.3 00.3	Markab	13 31.7 N15 19.6										
	20	122	02.0	85 08.2 10.5	32 23.1 35.0	105 34.5 50.3	147 35.5 00.2	Menkar	314 08.0 N 4 10.7										
	21	137	04.5	100 07.8 . . 11.6	47 24.2 . . 34.9	120 36.4 . . 50.5	162 37.7 . . 00.1	Menkent	147 59.1 S36 29.0										
	22	152	06.9	115 07.3 12.7	62 25.3 34.9	135 38.3 50.8	177 39.9 12 00.0	Miaplacidus	221 38.0 S69 48.9										
	23	167	09.4	130 06.9 13.7	77 26.4 34.9	150 40.2 51.0	192 42.1 11 59.9												
25	00	182	11.8	145 06.5 N15 14.8	92 27.6 N25 34.9	165 42.1 N 5 51.2	207 44.3 S11 59.8	Mirfak	308 30.7 N49 56.7										
	01	197	14.3	160 06.1 15.9	107 28.7 34.8	180 44.1 51.5	222 46.5 59.8	Nunki	75 49.7 S26 16.1										
	02	212	16.8	175 05.6 17.0	122 29.8 34.8	195 46.0 51.7	237 48.7 59.7	Peacock	53 08.4 S56 39.5										
	03	227	19.2	190 05.2 . . 18.1	137 31.0 . . 34.8	210 47.9 . . 51.9	252 50.9 . . 59.6	Pollux	243 19.0 N27 58.3										
	04	242	21.7	205 04.8 19.1	152 32.1 34.8	225 49.8 52.1	267 53.1 59.5	Procyon	244 52.3 N 5 09.9										
	05	257	24.2	220 04.3 20.2	167 33.2 34.7	240 51.7 52.4	282 55.3 59.4												
	06	272	26.6	235 03.9 N15 21.3	182 34.3 N25 34.7	255 53.6 N 5 52.6	297 57.5 S11 59.3	Rasalhague	95 59.9 N12 32.4										
	07	287	29.1	250 03.5 22.4	197 35.5 34.7	270 55.5 52.8	312 59.7 59.2	Regulus	207 35.8 N11 51.2										
	08	302	31.6	265 03.1 23.5	212 36.6 34.7	285 57.4 53.1	328 01.9 59.1	Rigel	281 05.4 S 8 10.6										
	09	317	34.0	280 02.6 . . 24.5	227 37.7 . . 34.6	300 59.3 . . 53.3	343 04.2 . . 59.0	Rigil Kent.	139 41.9 S60 55.7										
	10	332	36.5	295 02.2 25.6	242 38.8 34.6	316 01.3 53.5	358 06.4 58.9	Sabik	102 04.4 S15 45.3										
	11	347	39.0	310 01.8 26.7	257 40.0 34.6	331 03.2 53.8	13 08.6 58.8												
	12	2	41.4	325 01.3 N15 27.8	272 41.1 N25 34.6	346 05.1 N 5 54.0	28 10.8 S11 58.7	Schedar	349 33.3 N56 39.8										
	13	17	43.9	340 00.9 28.8	287 42.2 34.5	1 07.0 54.2	43 13.0 58.6	Shaula	96 12.3 S37 07.2										
	14	32	46.3	355 00.5 29.9	302 43.3 34.5	16 08.9 54.4	58 15.2 58.6	Sirius	258 27.5 S16 45.1										
	15	47	48.8	10 00.0 . . 31.0	317 44.5 . . 34.5	31 10.8 . . 54.7	73 17.4 . . 58.5	Spica	158 23.6 S11 17.0										
	16	62	51.3	24 59.6 32.1	332 45.6 34.4	46 12.7 54.9	88 19.6 58.4	Suhail	222 47.1 S43 31.7										
	17	77	53.7	39 59.2 33.1	347 46.7 34.4	61 14.6 55.1	103 21.8 58.3												
	18	92	56.2	54 58.7 N15 34.2	2 47.8 N25 34.4	76 16.5 N 5 55.4	118 24.0 S11 58.2	Vega	80 34.3 N38 47.9										
	19	107	58.7	69 58.3 35.3	17 49.0 34.9	91 18.4 55.6	133 26.2 58.1	Zuben'ubi	136 57.4 S16 08.3										
	20	123	01.1	84 57.9 36.3	32 50.1 34.3	106 20.4 55.8	148 24.4 58.0												
	21	138	03.6	99 57.4 . . 37.4	47 51.2 . . 34.3	121 22.3 . . 56.1	163 30.6 . . 57.9												
	22	153	06.1	114 57.0 38.5	62 52.3 34.3	136 24.2 56.3	178 32.8 57.8	Venus	324 03.9 14 19										
	23	168	08.5	129 56.6 39.5	77 53.4 34.2	151 26.1 56.5	193 35.0 57.7	Mars	270 47.7 17 51										
		h m						Jupiter	343 43.6 12 59										
Mer. Pass. 11 53.2		v -0.4 d 1.1		v 1.1 d, 0.0		v 1.9 d 0.2		v 2.2 d 0.1		Saturn	25 38.8 10 11								

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	23	24	25	26	
d h	° /	° /	° /	° /	° /	° /	°	h m	h m	h m	h m	h m	h m	h m	h m	
T H U R S D A Y	23 00	178 18.4 N 0 50.0	162 03.7 11.8 N 6 13.6 16.2 59.1				N 72	02 55	04 30	05 39	05 46	04 58				
	01	193 18.5 51.0	176 34.5 11.7 6 29.8 16.1 59.1				N 70	03 18	04 40	05 42	05 57	05 23	04 24			
	02	208 18.7 51.9	191 05.2 11.8 6 45.9 16.1 59.0				68	03 36	04 48	05 44	06 05	05 42	05 08			
	03	223 18.9 52.9	205 36.0 11.8 7 02.0 16.0 59.0				66	03 50	04 55	05 46	06 13	05 57	05 37	04 59		
	04	238 19.1 53.9	220 06.8 11.8 7 18.0 16.0 59.0				64	04 01	05 00	05 48	06 19	06 10	06 00	05 44		
	05	253 19.3 54.9	234 37.6 11.8 7 34.0 15.9 58.9				62	04 10	05 05	05 49	06 25	06 21	06 18	06 15		
	06	268 19.5 N 0 55.9	249 08.4 11.8 N 7 49.9 15.8 58.9				60	04 18	05 09	05 51	06 30	06 30	06 33	06 38		
	07	283 19.7 56.9	263 39.2 11.7 8 05.7 15.8 58.9				N 58	04 25	05 12	05 52	06 34	06 39	06 45	06 56		
	08	298 19.9 57.9	278 09.9 11.8 8 21.5 15.8 58.9				56	04 31	05 15	05 53	06 38	06 46	06 57	07 12		
	09	313 20.0 58.9	292 40.7 11.8 8 37.3 15.7 58.8				54	04 36	05 18	05 53	06 41	06 52	07 06	07 25		
	10	328 20.2 0 59.8	307 11.5 11.7 8 53.0 15.6 58.8				52	04 40	05 20	05 54	06 44	06 58	07 15	07 37		
	11	343 20.4 1 00.8	321 42.2 11.7 9 08.6 15.5 58.8				50	04 44	05 23	05 55	06 47	07 04	07 23	07 48		
	12	358 20.6 N 1 01.8	336 12.9 11.8 N 9 24.1 15.5 58.7				45	04 53	05 27	05 56	06 53	07 15	07 40	08 10		
	13	13 20.8 02.8	350 43.7 11.7 9 39.6 15.4 58.7				N 40	04 59	05 31	05 58	06 59	07 25	07 54	08 27		
	14	28 21.0 03.8	5 14.4 11.7 9 55.0 15.4 58.7				35	05 04	05 33	05 59	07 03	07 33	08 06	08 42		
	15	43 21.2 04.8	19 45.1 11.7 10 10.4 15.3 58.6				30	05 08	05 36	05 59	07 07	07 41	08 16	08 56		
	16	58 21.3 05.8	34 15.8 11.7 10 25.7 15.2 58.6				20	05 13	05 39	06 01	07 15	07 53	08 34	09 18		
	17	73 21.5 06.7	48 46.5 11.7 10 40.9 15.1 58.6				N 10	05 17	05 41	06 02	07 21	08 05	08 50	09 38		
	18	88 21.7 N 1 07.7	63 17.2 11.6 N10 56.0 15.1 58.5				0	05 18	05 42	06 03	07 27	08 15	09 05	09 56		
	19	103 21.9 08.7	77 47.8 11.7 11 11.1 15.0 58.5				S 10	05 19	05 43	06 04	07 33	08 26	09 20	10 14		
	20	118 22.1 09.7	92 18.5 11.6 11 26.1 14.9 58.4				20	05 17	05 43	06 05	07 39	08 38	09 36	10 34		
	21	133 22.3 10.7	106 49.1 11.6 11 41.0 14.8 58.4				30	05 14	05 42	06 06	07 47	08 51	09 55	10 57		
	22	148 22.5 11.7	121 19.7 11.6 11 55.8 14.8 58.4				35	05 11	05 41	06 06	07 51	08 59	10 06	11 11		
	23	163 22.7 12.7	135 50.3 11.6 12 10.6 14.7 58.3				40	05 08	05 40	06 07	07 56	09 08	10 18	11 27		
F R I D A Y	24 00	178 22.8 N 1 13.6	150 20.9 11.5 N12 25.3 14.6 58.3				45	05 03	05 38	06 07	08 02	09 18	10 33	11 46		
	01	193 23.0 14.6	164 51.4 11.6 12 39.9 14.5 58.3				S 50	04 57	05 35	06 08	08 09	09 31	10 52	12 10		
	02	208 23.2 15.6	179 22.0 11.5 12 54.4 14.4 58.2				52	04 55	05 34	06 08	08 12	09 37	11 00	12 21		
	03	223 23.4 16.6	193 52.5 11.5 13 08.8 14.4 58.2				54	04 51	05 33	06 08	08 16	09 44	11 10	12 34		
	04	238 23.6 17.6	208 23.0 11.4 13 23.2 14.2 58.2				56	04 47	05 31	06 08	08 20	09 51	11 21	12 49		
	05	253 23.8 18.6	222 53.4 11.5 13 37.4 14.2 58.1				58	04 43	05 29	06 09	08 24	09 59	11 34	13 07		
	06	268 24.0 N 1 19.6	237 23.9 11.4 N13 51.6 14.1 58.1				S 60	04 38	05 27	06 09	08 29	10 09	11 49	13 29		
	07	283 24.1 20.5	251 54.3 11.4 14 05.7 14.0 58.1				Lat.	Sunset	Twilight		Moonset					
	08	298 24.3 21.5	266 24.7 11.4 14 19.7 13.9 58.0						Civil	Naut.	23	24	25	26		
	09	313 24.5 22.5	280 55.1 11.3 14 33.6 13.8 58.0				°	h m	h m	h m	h m	h m	h m	h m	h m	h m
	10	328 24.7 23.5	295 25.4 11.4 14 47.4 13.8 58.0				N 72	18 36	19 46	21 23	22 38					
	11	343 24.9 24.5	309 55.8 11.3 15 01.2 13.6 57.9				N 70	18 33	19 36	20 59	22 16	24 59	00 59			
	12	358 25.1 N 1 25.5	324 26.1 11.2 N15 14.8 13.5 57.9				68	18 30	19 27	20 40	21 59	24 17	00 17			
	13	13 25.3 26.5	338 56.3 11.3 15 28.3 13.5 57.8				66	18 28	19 20	20 26	21 45	23 49	26 13	02 13		
	14	28 25.5 27.4	353 26.6 11.2 15 41.8 13.3 57.8				64	18 26	19 15	20 14	21 34	23 27	25 28	01 28		
	15	43 25.6 28.4	7 56.8 11.2 15 55.1 13.3 57.8				62	18 25	19 10	20 05	21 25	23 10	24 59	00 59		
	16	58 25.8 29.4	22 27.0 11.1 16 08.4 13.2 57.7				60	18 24	19 06	19 57	21 16	22 56	24 36	00 36		
	17	73 26.0 30.4	36 57.1 11.2 16 21.6 13.0 57.7				N 58	18 22	19 02	19 50	21 09	22 44	24 18	00 18		
	18	88 26.2 N 1 31.4	51 27.3 11.1 N16 34.6 13.0 57.7				56	18 21	18 59	19 44	21 03	22 34	24 03	00 03		
	19	103 26.4 32.4	65 57.4 11.0 16 47.6 12.8 57.6				54	18 20	18 56	19 38	20 58	22 25	23 50	25 11		
	20	118 26.6 33.3	80 27.4 11.1 17 00.4 12.8 57.6				52	18 20	18 53	19 34	20 53	22 17	23 39	24 57		
	21	133 26.8 34.3	94 57.5 11.0 17 13.2 12.6 57.6				50	18 19	18 51	19 30	20 48	22 10	23 29	24 44		
	22	148 27.0 35.3	109 27.5 11.0 17 25.8 12.6 57.5				45	18 17	18 46	19 21	20 39	21 54	23 08	24 19		
	23	163 27.1 36.3	123 57.5 10.9 17 38.4 12.4 57.5				N 40	18 16	18 43	19 15	20 31	21 42	22 51	23 58		
S A T U R D A Y	25 00	178 27.3 N 1 37.3	138 27.4 10.9 N17 50.8 12.3 57.4				35	18 15	18 40	19 10	20 24	21 31	22 37	23 41		
	01	193 27.5 38.3	152 57.3 10.9 18 03.1 12.3 57.4				30	18 14	18 38	19 06	20 18	21 22	22 25	23 27		
	02	208 27.7 39.2	167 27.2 10.9 18 15.4 12.1 57.4				20	18 12	18 34	19 00	20 07	21 06	22 04	23 02		
	03	223 27.9 40.2	181 57.1 10.8 18 27.5 12.0 57.3				N 10	18 11	18 32	18 56	19 58	20 52	21 46	22 41		
	04	238 28.1 41.2	196 26.9 10.8 18 39.5 11.9 57.3				0	18 10	18 30	18 54	19 50	20 39	21 29	22 21		
	05	253 28.3 42.2	210 56.7 10.7 18 51.4 11.8 57.3				S 10	18 09	18 30	18 54	19 41	20 26	21 12	22 01		
	06	268 28.5 N 1 43.2	225 26.4 10.7 N19 03.2 11.7 57.2				20	18 08	18 30	18 55	19 33	20 12	20 55	21 40		
	07	283 28.6 44.2	239 56.1 10.7 19 14.9 11.5 57.2				30	18 07	18 30	18 58	19 22	19 57	20 34	21 16		
	08	298 28.8 45.2	254 25.8 10.7 19 26.4 11.5 57.2				35	18 06	18 31	19 01	19 17	19 48	20 22	21 01		
	09	313 29.0 46.1	268 55.5 10.6 19 37.9 11.3 57.1				40	18 05	18 32	19 04	19 10	19 38	20 09	20 45		
	10	328 29.2 47.1	283 25.1 10.6 19 49.2 11.2 57.1				45	18 05	18 34	19 08	19 02	19 26	19 52	20 25		
	11	343 29.4 48.1	297 54.7 10.5 20 00.4 11.1 57.1				S 50	18 04	18 36	19 14	18 53	19 11	19 33	20 00		
	12	358 29.6 N 1 49.1	312 24.2 10.5 N20 11.5 11.0 57.0				52	18 04	18 37	19 17	18 49	19 04	19 23	19 49		
	13	13 29.8 50.1	326 53.7 10.5 20 22.5 10.9 57.0				54	18 04	18 39	19 20	18 45	18 57	19 13	19 35		
	14	28 30.0 51.1	341 23.2 10.5 20 33.4 10.8 56.9				56	18 03	18 40	19 24	18 39	18 49	19 01	19 19		
	15	43 30.1 52.0	355 52.7 10.4 20 44.2 10.6 56.9				58	18 03	18 42	19 28	18 34	18 39	18 48	19 01		
	16	58 30.3 53.0	10 22.1 10.3 20 54.8 10.5 56.9				S 60	18 02	18 44	19 33	18 27	18 29	18 32	18 38		
	17	73 30.5 54.0	24 51.4 10.4 21 05.3 10.4 56.8				SUN									
	18	88 30.7 N 1 55.0	39 20.8 10.3 N21 15.7 10.3 56.8				Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase		
	19	103 30.9 56.0	53 50.1 10.3 21 26.0 10.1 56.8					00 ^h	12 ^h	Pass.	Upper	Lower	d	%		
	20	118 31.1 57.0	68 19.4 1													

UT	ARIES		VENUS −4.0		MARS +0.9		JUPITER −2.1		SATURN +0.9		STARS		
	GHA ° / '	GHA ° / ' Dec ° / '	GHA ° / ' Dec ° / '	GHA ° / ' Dec ° / '	GHA ° / ' Dec ° / '	GHA ° / ' Dec ° / '	GHA ° / ' Dec ° / '	Name	SHA ° / '	Dec ° / '			
26 													

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
										26	27		28	29		
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>	HP	Naut.							Civil	h m
^{d h}	[°]	[°]	[°]	[°]	[°]	[°]	[°]	[°]	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}	^{h m}
SUNDAY	26 00	178 31.8 N 2 00.9	126 16.1 10.1 N22 15.5	9.5	56.6			N 72	02 31	04 13	05 24					
	01	193 32.0 01.9	140 45.2 10.1 22 25.0	9.4	56.6			N 70	02 59	04 25	05 28					
	02	208 32.2 02.8	155 14.3 10.1 22 34.4	9.3	56.5			68	03 20	04 35	05 32					
	03	223 32.4 03.8	169 43.4 10.0 22 43.7	9.2	56.5			66	03 36	04 42	05 35	04 59				
	04	238 32.6 04.8	184 12.4 9.9 22 52.8	9.1	56.5			64	03 48	04 49	05 37	05 44	05 00			
	05	253 32.8 05.8	198 41.3 10.0 23 01.9	8.9	56.4			62	03 59	04 55	05 40	06 15	06 12	06 14	06 57	
	06	268 33.0 N 2 06.8	213 10.3 9.9 N23 10.8	8.7	56.4			60	04 08	04 59	05 41	06 38	06 48	07 12	08 02	
	07	283 33.2 07.8	227 39.2 9.9 23 19.5	8.6	56.4			N 58	04 15	05 04	05 43	06 56	07 14	07 45	08 36	
	08	298 33.3 08.7	242 08.1 9.8 23 28.1	8.5	56.3			56	04 22	05 07	05 45	07 12	07 35	08 10	09 02	
	09	313 33.5 09.7	256 36.9 9.8 23 36.6	8.4	56.3			54	04 28	05 10	05 46	07 25	07 52	08 30	09 22	
	10	328 33.7 10.7	271 05.8 9.8 23 45.0	8.3	56.3			52	04 33	05 13	05 47	07 37	08 06	08 46	09 38	
	11	343 33.9 11.7	285 34.6 9.7 23 53.3	8.1	56.2			50	04 37	05 16	05 48	07 48	08 19	09 01	09 53	
	12	358 34.1 N 2 12.7	300 03.3 9.8 N24 01.4	7.9	56.2			45	04 47	05 21	05 51	08 10	08 46	09 30	10 22	
	13	13 34.3 13.6	314 32.1 9.7 24 09.3	7.9	56.2			N 40	04 54	05 26	05 53	08 27	09 07	09 53	10 45	
	14	28 34.5 14.6	329 00.8 9.6 24 17.2	7.7	56.1			35	04 59	05 29	05 54	08 42	09 24	10 11	11 04	
	15	43 34.7 15.6	343 29.4 9.7 24 24.9	7.6	56.1			30	05 04	05 32	05 56	08 56	09 39	10 28	11 20	
	16	58 34.8 16.6	357 58.1 9.6 24 32.5	7.4	56.1			N 10	05 11	05 36	05 58	09 18	10 05	10 55	11 48	
	17	73 35.0 17.6	12 26.7 9.6 24 39.9	7.3	56.0			0	05 15	05 39	06 00	09 38	10 27	11 19	12 11	
	18	88 35.2 N 2 18.6	26 55.3 9.6 N24 47.2	7.2	56.0			S 10	05 17	05 41	06 02	09 56	10 48	11 41	12 33	
	19	103 35.4 19.5	41 23.9 9.5 24 54.4	7.0	56.0			20	05 19	05 43	06 04	10 14	11 09	12 03	12 55	
	20	118 35.6 20.5	55 52.4 9.5 25 01.4	6.9	55.9			30	05 18	05 44	06 06	10 34	11 32	12 27	13 19	
	21	133 35.8 21.5	70 20.9 9.5 25 08.3	6.8	55.9			35	05 16	05 44	06 07	10 57	11 58	12 55	13 46	
	22	148 36.0 22.5	84 49.4 9.5 25 15.1	6.6	55.9			40	05 14	05 43	06 08	11 11	12 13	13 11	14 02	
	23	163 36.2 23.5	99 17.9 9.5 25 21.7	6.5	55.9			45	05 11	05 43	06 10	11 27	12 32	13 30	14 21	
MONDAY	27 00	178 36.4 N 2 24.4	113 46.4 9.4 N25 28.2	6.3	55.8			S 50	05 07	05 42	06 11	11 46	12 53	13 53	14 44	
	01	193 36.5 25.4	128 14.8 9.4 25 34.5	6.2	55.8			52	05 02	05 40	06 12	12 10	13 21	14 23	15 13	
	02	208 36.7 26.4	142 43.2 9.4 25 40.7	6.1	55.8			50	05 00	05 39	06 13	12 21	13 35	14 38	15 27	
	03	223 36.9 27.4	157 11.6 9.4 25 46.8	5.9	55.7			54	04 57	05 38	06 14	12 34	13 51	14 55	15 44	
	04	238 37.1 28.4	171 40.0 9.3 25 52.7	5.8	55.7			56	04 54	05 37	06 14	12 49	14 10	15 16	16 03	
	05	253 37.3 29.3	186 08.3 9.4 25 58.5	5.7	55.7			S 60	04 50	05 36	06 15	13 07	14 33	15 42	16 28	
	06	268 37.5 N 2 30.3	200 36.7 9.3 N26 04.2	5.5	55.6				04 46	05 35	06 16	13 29	15 03	16 18	17 01	
	07	283 37.7 31.3	215 05.0 9.3 26 09.7	5.3	55.6			Lat.	Sunset	Twilight		Moonset				
	08	298 37.9 32.3	229 33.3 9.3 26 15.0	5.3	55.6					Civil	Naut.	26	27	28	29	
	09	313 38.0 33.3	244 01.6 9.2 26 20.3	5.1	55.6											
	10	328 38.2 34.2	258 29.8 9.2 26 25.4	4.9	55.5											
	11	343 38.4 35.2	272 58.1 9.2 26 30.3	4.8	55.5			N 72	18 50	20 02	21 46					
	12	358 38.6 N 2 36.2	287 26.3 9.3 N26 35.1	4.7	55.5			N 70	18 45	19 49	21 17					
	13	13 38.8 37.2	301 54.6 9.2 26 39.8	4.5	55.5			68	18 41	19 39	20 55					
	14	28 39.0 38.2	316 22.8 9.2 26 44.3	4.4	55.4			66	18 38	19 31	20 38	02 13				
	15	43 39.2 39.1	330 51.0 9.2 26 48.7	4.2	55.4			64	18 35	19 24	20 25	01 28	04 01			
	16	58 39.4 40.1	345 19.2 9.2 26 52.9	4.1	55.4			62	18 33	19 18	20 14	00 59	02 49	04 37	05 44	
	17	73 39.6 41.1	359 47.4 9.2 26 57.0	4.0	55.3			60	18 31	19 13	20 05	00 36	02 14	03 40	04 39	
	18	88 39.7 N 2 42.1	14 15.6 9.2 N27 01.0	3.8	55.3			N 58	18 29	19 09	19 57	00 18	01 48	03 07	04 04	
	19	103 39.9 43.0	28 43.8 9.1 27 04.8	3.7	55.3			56	18 27	19 05	19 51	00 03	01 28	02 42	03 39	
	20	118 40.1 44.0	43 11.9 9.2 27 08.5	3.5	55.3			54	18 26	19 02	19 45	25 11	01 11	02 22	03 19	
	21	133 40.3 45.0	57 40.1 9.2 27 12.0	3.4	55.2			52	18 25	18 59	19 39	24 57	00 57	02 06	03 02	
	22	148 40.5 46.0	72 08.3 9.2 27 15.4	3.3	55.2			50	18 23	18 56	19 35	24 44	00 44	01 52	02 48	
	23	163 40.7 47.0	86 36.5 9.1 27 18.7	3.1	55.2			45	18 21	18 50	19 25	24 19	00 19	01 23	02 18	
TUESDAY	28 00	178 40.9 N 2 47.9	101 04.6 9.2 N27 21.8	2.9	55.2			N 40	18 19	18 46	19 18	23 58	25 00	01 00	01 55	
	01	193 41.1 48.9	115 32.8 9.2 27 24.7	2.9	55.1			35	18 17	18 42	19 12	23 41	24 42	00 42	01 36	
	02	208 41.2 49.9	130 01.0 9.1 27 27.6	2.6	55.1			30	18 15	18 39	19 07	23 27	24 26	00 26	01 20	
	03	223 41.4 50.9	144 29.1 9.2 27 30.2	2.6	55.1			20	18 13	18 35	19 01	23 02	23 59	24 52	00 52	
	04	238 41.6 51.8	158 57.3 9.2 27 32.8	2.4	55.1			N 10	18 11	18 32	18 56	22 41	23 35	24 28	00 28	
	05	253 41.8 52.8	173 25.5 9.2 27 35.2	2.2	55.0			0	18 09	18 29	18 53	22 21	23 14	24 06	00 06	
	06	268 42.0 N 2 53.8	187 53.7 9.1 N27 37.4	2.1	55.0			S 10	18 07	18 28	18 52	22 01	22 52	23 44	24 36	
	07	283 42.2 54.8	202 21.8 9.2 27 39.5	2.0	55.0			20	18 05	18 27	18 52	21 40	22 29	23 20	24 13	
	08	298 42.4 55.8	216 50.0 9.3 27 41.5	1.8	55.0			30	18 03	18 27	18 55	21 16	22 02	22 52	23 47	
	09	313 42.6 56.7	231 18.3 9.2 27 43.3	1.7	55.0			35	18 02	18 27	18 56	21 01	21 46	22 36	23 31	
	10	328 42.8 57.7	245 46.5 9.2 27 45.0	1.5	54.9			40	18 01	18 28	18 59	20 45	21 27	22 17	23 12	
	11	343 42.9 58.7	260 14.7 9.2 27 46.5	1.4	54.9			45	17 59	18 28	19 03	20 25	21 05	21 53	22 50	
	12	358 43.1 N 2 59.7	274 42.9 9.3 N27 47.9	1.3	54.9			S 50	17 58	18 30	19 07	20 00	20 37	21 24	22 21	
	13	13 43.3 3 00.6	289 11.2 9.2 27 49.2	1.1	54.9			52	17 57	18 30	19 10	19 49	20 23	21 09	22 07	
	14	28 43.5 01.6	303 39.4 9.3 27 50.3	1.0	54.9			54	17 56	18 31	19 12	19 35	20 07	20 52	21 50	
	15	43 43.7 02.6	318 07.7 9.3 27 51.3	0.8	54.8			56	17 55	18 32	19 16	19 19	19 48	20 31	21 31	
	16	58 43.9 03.6	332 36.0 9.3 27 52.1	0.7	54.8			58	17 54	18 33	19 19	19 01	19 24	20 05	21 07	
	17	73 44.1 04.6	347 04.3 9.4 27 52.8	0.6	54.8			S 60	17 53	18 35	19 23	18 38	18 54	19 29	20 34	
	18	88 44.3 N 3 05.5	1 32.7 9.3 N27 53.4	0.4	54.8			SUN		MOON						
	19	103 44.4 06.5	16 01.0 9.4 27 53.8	0.3	54.8			Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
	20	118 44.6 07.5	30 29.4 9.4 27 54.1	0.1	54.7		00 ^h		12 ^h	Pass.	Upper	Lower				
	21	133 44.8 08.5	44 57.8 9.4 27 54.2	0.0	54.7		^d	^{m s}	^{m s}	^{h m}	^{h m}	^{h m}	^d	[%]		
	22	148 45.0 09.4	59 26.2 9.4 27 54.2	0.2	54.7		26	05 53</								

UT		ARIES			VENUS -4.0			MARS +0.9			JUPITER -2.1			SATURN +0.9			STARS							
		GHA		GHA	Dec	GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	Name	SHA	Dec				
d	h	°	'	°	'	°	'	°	'	°	'	°	'	°	'	°	'		°	'				
29 WEDNESDAY	00	186	08.4	144	23.9	N16	55.6	94	14.6	N25	31.6	168	45.4	N 6	13.3	211	16.1	S11	51.1	Acamar	315	13.2	S40	12.9
	01	201	10.9	159	23.5		56.7	109	15.7		31.6	183	47.3		13.5	226	18.3		51.0	Achernar	335	21.8	S57	07.3
	02	216	13.3	174	23.0		57.7	124	16.8		31.5	198	49.2		13.7	241	20.5		50.9	Acrux	173	01.0	S63	13.7
	03	231	15.8	189	22.5		58.7	139	17.9		31.5	213	51.1		14.0	256	22.7		50.8	Adhara	255	07.0	S29	00.4
	04	246	18.3	204	22.1	16	59.7	154	19.0		31.5	228	53.0		14.2	271	25.0		50.7	Aldebaran	290	41.5	N16	33.3
	05	261	20.7	219	21.6	17	00.7	169	20.1		31.4	243	54.9		14.4	286	27.2		50.6					
	06	276	23.2	234	21.2	N17	01.7	184	21.2	N25	31.4	258	56.8	N 6	14.7	301	29.4	S11	50.5	Alioth	166	13.7	N55	50.0
	07	291	25.7	249	20.7		02.8	199	22.3		31.3	273	58.8		14.9	316	31.6		50.4	Alkaid	152	52.7	N49	11.7
	08	306	28.1	264	20.2		03.8	214	23.4		31.3	289	00.7		15.1	331	33.8		50.3	Alnair	27	35.1	S46	50.9
	09	321	30.6	279	19.8		04.8	229	24.5		31.2	304	02.6		15.3	346	36.0		50.3	Alnilam	275	39.3	S 1	11.3
	10	336	33.0	294	19.3		05.8	244	25.6		31.2	319	04.5		15.6	1	38.2		50.2	Alphard	217	49.0	S 8	45.3
	11	351	35.5	309	18.8		06.8	259	26.7		31.1	334	06.4		15.8	16	40.4		50.1					
	12	6	38.0	324	18.4	N17	07.8	274	27.8	N25	31.1	349	08.3	N 6	16.0	31	42.6	S11	50.0	Alphecca	126	04.7	N26	38.0
	13	21	40.4	339	17.9		08.8	289	28.9		31.1	4	10.2		16.3	46	44.9		49.9	Alpheratz	357	36.7	N29	12.9
	14	36	42.9	354	17.4		09.8	304	30.0		31.0	19	12.1		16.5	61	47.1		49.8	Altair	62	01.5	N 8	55.5
	15	51	45.4	9	17.0		10.8	319	31.1		31.0	34	14.0		16.7	76	49.3		49.7	Ankaa	353	09.0	S42	10.9
	16	66	47.8	24	16.5		11.8	334	32.2		30.9	49	15.9		17.0	91	51.5		49.6	Antares	112	17.5	S26	29.0
	17	81	50.3	39	16.1		12.8	349	33.3		30.9	64	17.8		17.2	106	53.7		49.5					
	18	96	52.8	54	15.6	N17	13.8	4	34.4	N25	30.8	79	19.7	N 6	17.4	121	55.9	S11	49.4	Arcturus	145	49.0	N19	03.5
	19	111	55.2	69	15.1		14.9	19	35.4		30.8	94	21.6		17.6	136	58.1		49.4	Atria	107	12.8	S69	03.9
	20	126	57.7	84	14.7		15.9	34	36.5		30.7	109	23.5		17.9	152	00.3		49.3	Avior	234	15.1	S59	35.3
	21	142	00.2	99	14.2		16.9	49	37.6		30.7	124	25.4		18.1	167	02.5		49.2	Bellatrix	278	24.6	N 6	22.2
	22	157	02.6	114	13.7		17.9	64	38.7		30.6	139	27.4		18.3	182	04.8		49.1	Betelgeuse	270	53.8	N 7	24.6
	23	172	05.1	129	13.2		18.9	79	39.8		30.6	154	29.3		18.6	197	07.0		49.0					
30 THURSDAY	00	187	07.5	144	12.8	N17	19.9	94	40.9	N25	30.5	169	31.2	N 6	18.8	212	09.2	S11	48.9	Canopus	263	53.1	S52	42.7
	01	202	10.0	159	12.3		20.9	109	42.0		30.5	184	33.1		19.0	227	11.4		48.8	Capella	280	24.2	N46	01.4
	02	217	12.5	174	11.8		21.9	124	43.1		30.5	199	35.0		19.2	242	13.6		48.7	Deneb	49	27.0	N45	21.4
	03	232	14.9	189	11.4		22.9	139	44.2		30.4	214	36.9		19.5	257	15.8		48.6	Denebola	182	26.1	N14	26.5
	04	247	17.4	204	10.9		23.9	154	45.3		30.4	229	38.8		19.7	272	18.0		48.6	Diphda	348	49.1	S17	51.7
	05	262	19.9	219	10.4		24.9	169	46.4		30.3	244	40.7		19.9	287	20.2		48.5					
	06	277	22.3	234	10.0	N17	25.8	184	47.5	N25	30.3	259	42.6	N 6	20.2	302	22.4	S11	48.4	Dubhe	193	42.2	N61	37.7
	07	292	24.8	249	09.5		26.8	199	48.6		30.2	274	44.5		20.4	317	24.7		48.3	Einath	278	03.9	N28	37.6
	08	307	27.3	264	09.0		27.8	214	49.7		30.2	289	46.4		20.6	332	26.9		48.2	Eltanin	90	42.8	N51	28.8
	09	322	29.7	279	08.6		28.8	229	50.8		30.1	304	48.3		20.9	347	29.1		48.1	Enif	33	40.5	N 9	58.7
	10	337	32.2	294	08.1		29.8	244	51.9		30.1	319	50.2		21.1	2	31.3		48.0	Fomalhaut	15	16.5	S29	30.1
	11	352	34.7	309	07.6		30.8	259	53.0		30.0	334	52.1		21.3	17	33.5		47.9					
	12	7	37.1	324	07.1	N17	31.8	274	54.1	N25	30.0	349	54.0	N 6	21.5	32	35.7	S11	47.8	Gacrux	171	52.7	S57	14.6
	13	22	39.6	339	06.7		32.8	289	55.1		29.9	4	55.9		21.8	47	37.9		47.7	Gienah	175	44.8	S17	40.3
	14	37	42.0	354	06.2		33.8	304	56.2		29.9	19	57.9		22.0	62	40.1		47.7	Hadar	148	37.5	S60	29.0
	15	52	44.5	9	05.7		34.8	319	57.3		29.8	34	59.8		22.2	77	42.4		47.6	Hamal	327	53.2	N23	34.2
	16	67	47.0	24	05.2		35.8	334	58.4		29.8	50	01.7		22.5	92	44.6		47.5	Kaus Aust.	83	34.5	S34	22.4
	17	82	49.4	39	04.8		36.8	349	59.5		29.7	65	03.6		22.7	107	46.8		47.4					
	18	97	51.9	54	04.3	N17	37.7	5	00.6	N25	29.7	80	05.5	N 6	22.9	122	49.0	S11	47.3	Kochab	137	18.8	N74	03.4
	19	112	54.4	69	03.8		38.7	20	01.7		29.6	95	07.4		23.1	137	51.2		47.2	Markab	13	31.7	N15	19.6
	20	127	56.8	84	03.3		39.7	35	02.8		29.6	110	09.3		23.4	152	53.4		47.1	Menkar	314	08.0	N 4	10.7
	21	142	59.3	99	02.9		40.7	50	03.9		29.5	125	11.2		23.6	167	55.6		47.0	Menkent	147	59.0	S36	29.0
	22	158	01.8	114	02.4		41.7	65	05.0		29.5	140	13.1		23.8	182	57.8		46.9	Miaplacidus	221	38.0	S69	48.9
	23	173	04.2	129	01.9		42.7	80	06.1		29.4	155	15.0		24.1	198	00.1		46.9					
31 FRIDAY	00	188	06.7	144	01.4	N17	43.7	95	07.1	N25	29.4	170	16.9	N 6	24.3	213	02.3	S11	46.8	Mirfak	308	30.8	N49	56.7
	01	203	09.1	159	01.0		44.6	110	08.2		29.3	185	18.8		24.5	228	04.5		46.7	Nunki	75	49.6	S26	16.1
	02	218	11.6	174	00.5		45.6	125	09.3		29.2	200	20.7		24.8	243	06.7		46.6	Peacock	53	08.3	S56	39.5
	03	233	14.1	189	00.0		46.6	140	10.4		29.2	215	22.6		25.0	258	08.9		46.5	Pollux	243	19.0	N27	58.3
	04	248	16.5	203	59.5		47.6	155	11.5		29.1	230	24.5		25.2	273	11.1		46.4	Procyon	244	52.3	N 5	09.9
	05	263	19.0	218	59.0		48.6	170	12.6		29.1	245	26.4		25.4	288	13.3		46.3					
	06	278	21.5	233	58.6	N17	49.5	185	13.7	N25	29.0	260	28.3	N 6	25.7	303	15.6	S11	46.2	Rasalhague	95	59.8	N12	32.4
	07	293	23.9	248	58.1		50.5	200	14.8		29.0	275	30.2		25.9	318	17.8		46.1	Regulus	207	35.8	N11	51.2
	08	308	26.4	263	57.6		51.5	215	15.9		28.9	290	32.2		26.1	333	20.0		46.1	Rigel	281	05.4	S 8	10.6
	09	323	28.9	278	57.1		52.5	230	16.9															

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	29	30	31	1	
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m	
WEDNESDAY	29 00	178 45.4	N 3 11.4	88 23.1	9.5	N27 53.7	0.4	54.7	N 70	02 38	04 10	05 14	□	□	□	□
	01	193 45.6	12.4	102 51.6	9.5	27 53.3	0.5	54.6	68	03 03	04 21	05 19	□	□	□	10 26
	02	208 45.8	13.3	117 20.1	9.5	27 52.8	0.7	54.6	66	03 21	04 30	05 23	□	□	□	11 09
	03	223 46.0	14.3	131 48.6	9.6	27 52.1	0.9	54.6	64	03 36	04 38	05 27	□	□	09 43	11 38
	04	238 46.1	15.3	146 17.2	9.6	27 51.2	1.0	54.6	62	03 47	04 44	05 30	06 57	08 37	10 21	12 00
	05	253 46.3	16.3	160 45.8	9.6	27 50.2	1.1	54.6	60	03 57	04 50	05 32	08 02	09 19	10 47	12 17
	06	268 46.5	N 3 17.2	175 14.4	9.7	N27 49.1	1.2	54.6	N 58	04 06	04 55	05 35	08 36	09 47	11 08	12 32
	07	283 46.7	18.2	189 43.1	9.7	27 47.9	1.4	54.6	56	04 13	04 59	05 37	09 02	10 08	11 25	12 44
	08	298 46.9	19.2	204 11.8	9.7	27 46.5	1.5	54.5	54	04 20	05 03	05 39	09 22	10 26	11 39	12 55
	09	313 47.1	20.2	218 40.5	9.8	27 45.0	1.7	54.5	52	04 25	05 06	05 40	09 38	10 41	11 51	13 05
	10	328 47.3	21.1	233 09.3	9.8	27 43.3	1.8	54.5	50	04 30	05 09	05 42	09 53	10 55	12 02	13 13
	11	343 47.5	22.1	247 38.1	9.8	27 41.5	1.9	54.5	45	04 41	05 16	05 45	10 22	11 21	12 25	13 31
	12	358 47.6	N 3 23.1	262 06.9	9.9	N27 39.6	2.1	54.5	N 40	04 49	05 21	05 48	10 45	11 43	12 44	13 46
	13	13 47.8	24.1	276 35.8	9.9	27 37.5	2.2	54.5	35	04 55	05 25	05 50	11 04	12 00	12 59	13 58
	14	28 48.0	25.0	291 04.7	9.9	27 35.3	2.3	54.4	30	05 00	05 28	05 52	11 20	12 15	13 12	14 09
	15	43 48.2	26.0	305 33.6	10.0	27 33.0	2.4	54.4	20	05 08	05 34	05 56	11 48	12 41	13 35	14 27
	16	58 48.4	27.0	320 02.6	10.1	27 30.6	2.6	54.4	N 10	05 13	05 38	05 59	12 11	13 03	13 54	14 43
	17	73 48.6	28.0	334 31.7	10.0	27 28.0	2.8	54.4	0	05 17	05 41	06 01	12 33	13 24	14 12	14 58
	18	88 48.8	N 3 28.9	349 00.7	10.1	N27 25.2	2.8	54.4	S 10	05 18	05 43	06 04	12 55	13 44	14 30	15 13
	19	103 49.0	29.9	3 29.8	10.2	27 22.4	3.0	54.4	20	05 19	05 44	06 06	13 19	14 06	14 49	15 29
	20	118 49.1	30.9	17 59.0	10.2	27 19.4	3.1	54.4	30	05 18	05 45	06 09	13 46	14 32	15 11	15 47
	21	133 49.3	31.8	32 28.2	10.2	27 16.3	3.3	54.4	35	05 16	05 46	06 11	14 02	14 46	15 24	15 57
	22	148 49.5	32.8	46 57.4	10.3	27 13.0	3.3	54.4	40	05 14	05 46	06 13	14 21	15 04	15 39	16 09
23	163 49.7	33.8	61 26.7	10.4	27 09.7	3.5	54.3	45	05 11	05 45	06 15	14 44	15 24	15 57	16 23	
THURSDAY	30 00	178 49.9	N 3 34.8	75 56.1	10.3	N27 06.2	3.7	54.3	S 50	05 07	05 45	06 17	15 13	15 50	16 19	16 40
	01	193 50.1	35.7	90 25.4	10.5	27 02.5	3.7	54.3	52	05 05	05 44	06 18	15 27	16 03	16 29	16 48
	02	208 50.3	36.7	104 54.9	10.5	26 58.8	3.9	54.3	54	05 03	05 44	06 19	15 44	16 17	16 41	16 57
	03	223 50.5	37.7	119 24.4	10.5	26 54.9	4.0	54.3	56	05 00	05 43	06 21	16 03	16 34	16 54	17 07
	04	238 50.7	38.7	133 53.9	10.6	26 50.9	4.2	54.3	58	04 57	05 43	06 22	16 28	16 54	17 09	17 18
	05	253 50.8	39.6	148 23.5	10.6	26 46.7	4.2	54.3	S 60	04 53	05 42	06 23	17 01	17 19	17 27	17 31
	06	268 51.0	N 3 40.6	162 53.1	10.7	N26 42.5	4.4	54.3	Lat.	Sunset	Twilight		Moonset			
	07	283 51.2	41.6	177 22.8	10.7	26 38.1	4.5	54.3			Civil	Naut.	29	30	31	1
	08	298 51.4	42.5	191 52.5	10.8	26 33.6	4.7	54.3	°	h m	h m	h m	h m	h m	h m	h m
	09	313 51.6	43.5	206 22.3	10.8	26 28.9	4.7	54.3								
	10	328 51.8	44.5	220 52.1	10.9	26 24.2	4.9	54.2	N 70	18 57	20 03	21 36	□	□	□	□
	11	343 52.0	45.5	235 22.0	10.9	26 19.3	5.0	54.2	68	18 52	19 51	21 11	□	□	□	07 22
	12	358 52.2	N 3 46.4	249 51.9	11.0	N26 14.3	5.1	54.2	66	18 48	19 41	20 52	□	□	□	06 38
	13	13 52.3	47.4	264 21.9	11.1	26 09.2	5.3	54.2	64	18 44	19 33	20 36	□	□	□	06 08
	14	28 52.5	48.4	278 52.0	11.1	26 03.9	5.4	54.2	62	18 41	19 27	20 24	05 44	05 50	05 49	05 46
	15	43 52.7	49.3	293 22.1	11.1	25 58.5	5.4	54.2	60	18 38	19 21	20 14	04 39	05 09	05 22	05 27
	16	58 52.9	50.3	307 52.2	11.2	25 53.1	5.6	54.2	N 58	18 36	19 16	20 05	04 04	04 40	05 00	05 12
	17	73 53.1	51.3	322 22.4	11.3	25 47.5	5.8	54.2	56	18 34	19 11	19 58	03 39	04 18	04 43	04 59
	18	88 53.3	N 3 52.3	336 52.7	11.3	N25 41.7	5.8	54.2	54	18 32	19 08	19 51	03 19	04 00	04 28	04 48
	19	103 53.5	53.2	351 23.0	11.4	25 35.9	5.9	54.2	52	18 30	19 04	19 45	03 02	03 45	04 15	04 38
	20	118 53.7	54.2	5 53.4	11.4	25 30.0	6.1	54.2	50	18 28	19 01	19 40	02 48	03 31	04 04	04 28
	21	133 53.8	55.2	20 23.8	11.5	25 23.9	6.2	54.2	45	18 25	18 54	19 30	02 18	03 04	03 40	04 09
	22	148 54.0	56.1	34 54.3	11.6	25 17.7	6.3	54.2	Lat.	Sun	MOON					
23	163 54.2	57.1	49 24.9	11.6	25 11.4	6.4	54.2	Day			Eqn. of Time	Mer.	Mer. Pass.		Age	Phase
FRIDAY	31 00	178 54.4	N 3 58.1	63 55.5	11.6	N25 05.0	6.5	54.2	d	m s	m s	h m	h m	h m	d	%
	01	193 54.6	3 59.0	78 26.1	11.8	24 58.5	6.7	54.2								
	02	208 54.8	4 00.0	92 56.9	11.7	24 51.8	6.7	54.2	30	04 41	04 32	12 05	19 36	07 11	09 63	☾
	03	223 55.0	01.0	107 27.6	11.9	24 45.1	6.9	54.2	31	04 23	04 14	12 04	20 23	08 00	10 72	
	04	238 55.1	02.0	121 58.5	11.9	24 38.2	6.9	54.2	SD	16.0	d	1.0	SD	14.8	14.8	14.8
	05	253 55.3	02.9	136 29.4	11.9	24 31.3	7.1	54.2								
	06	268 55.5	N 4 03.9	151 00.3	12.1	N24 24.2	7.2	54.2								
	07	283 55.7	04.9	165 31.4	12.0	24 17.0	7.3	54.2								
	08	298 55.9	05.8	180 02.4	12.2	24 09.7	7.4	54.2								
	09	313 56.1	06.8	194 33.6	12.2	24 02.3	7.5	54.2								
	10	328 56.3	07.8	209 04.8	12.2	23 54.8	7.6	54.2								
	11	343 56.5	08.7	223 36.0	12.3	23 47.2	7.7	54.2								
	12	358 56.6	N 4 09.7	238 07.3	12.4	N23 39.5	7.8	54.2								
	13	13 56.8	10.7	252 38.7	12.4	23 31.7	8.0	54.2								
	14	28 57.0	11.6	267 10.1	12.5	23 23.7	8.0	54.2								
	15	43 57.2	12.6	281 41.6	12.6	23 15.7	8.1	54.2								
	16	58 57.4	13.6	296 13.2	12.6	23 07.6	8.2	54.2								
	17	73 57.6	14.5	310 44.8	12.7	22 59.4	8.4	54.2								
	18	88 57.8	N 4 15.5	325 16.5	12.7	N22 51.0	8.4	54.2								
	19	103 57.9	16.5	339 48.2	12.8	22 42.6	8.5	54.2								
	20	118 58.1	17.4	354 20.0	12.8	22 34.1	8.7	54.2								
	21	133 58.3	18.4	8 51.8	12.9	22 25.4	8.7	54.2								
	22	148 58.5	19.4	23 23.7	13.0	22 16.7	8.8	54.2								
23	163 58.7	20.3	37 55.7	13.0	N22 07.9	8.9	54.2									

UT	ARIES			VENUS −4.0			MARS +1.0			JUPITER −2.1			SATURN +0.9			STARS																					
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec																							
SATURDAY	00	189 05.8	143 49.9 N18 07.0	95 33.2 N25 28.0	171 02.6 N 6 29.8	213 55.4 S11 44.6	Acamar	315 13.2	S40 12.9	SUNDAY	01	204 08.3	158 49.4	08.0	110 34.3	28.0	186 04.5	30.0	228 57.6	44.6	Achernar	335 21.8	S57 07.3														
	02	219 10.8	173 48.9	08.9	125 35.4	27.9	201 06.4	30.3	243 59.8		44.5	03	234 13.2	188 48.4	09.9	140 36.5	27.9	216 08.3	30.5	259 02.1	44.4	Acrux	173 01.0	S63 13.7													
	04	249 15.7	203 47.9	10.9	155 37.6	27.8	231 10.3	30.7	274 04.3		44.3	05	264 18.1	218 47.5	11.8	170 38.6	27.8	246 12.2	30.9	289 06.5	44.2	Adhara	255 07.0	S29 00.4													
	06	279 20.6	233 47.0 N18 12.8	185 39.7 N25 27.7	261 14.1 N 6 31.2	304 08.7 S11 44.1	Alioth	166 13.7	N55 50.0		07	294 23.1	248 46.5	13.7	200 40.8	27.6	276 16.0	31.4	319 10.9	44.0	Alkaid	152 52.7	N49 11.7														
	08	309 25.5	263 46.0	14.7	215 41.9	27.6	291 17.9	31.6	334 13.1		43.9	09	324 28.0	278 45.5	15.7	230 43.0	27.5	306 19.8	31.9	349 15.4	43.9	Alnair	27 35.1	S46 50.9													
	10	339 30.5	293 45.0	16.6	245 44.0	27.5	321 21.7	32.1	4 17.6		43.8	11	354 32.9	308 44.5	17.6	260 45.1	27.4	336 23.6	32.3	19 19.8	43.7	Alnilam	275 39.3	S 1 11.3													
	12	9 35.4	323 44.0 N18 18.5	275 46.2 N25 27.3	351 25.5 N 6 32.5	34 22.0 S11 43.6	Alphecca	126 04.7	N26 38.0		13	24 37.9	338 43.6	19.5	290 47.3	27.3	6 27.4	32.8	49 24.2	43.5	Alpheratz	357 36.7	N29 12.9														
	14	39 40.3	353 43.1	20.4	305 48.4	27.2	21 29.3	33.0	64 26.4		43.4	15	54 42.8	8 42.6	21.4	320 49.5	27.2	36 31.2	33.2	79 28.7	43.3	Altair	62 01.5	N 8 55.5													
	16	69 45.2	23 42.1	22.3	335 50.5	27.1	51 33.1	33.5	94 30.9		43.2	17	84 47.7	38 41.6	23.3	350 51.6	27.0	66 35.0	33.7	109 33.1	43.2	Ankaa	353 09.0	S42 10.9													
	18	99 50.2	53 41.1 N18 24.2	5 52.7 N25 27.0	81 36.9 N 6 33.9	124 35.3 S11 43.1	Arcturus	145 49.0	N19 03.6		19	114 52.6	68 40.6	25.2	20 53.8	26.9	96 38.8	34.1	139 37.5	43.0	Antares	112 17.5	S26 29.0														
	20	129 55.1	83 40.1	26.1	35 54.9	26.9	111 40.7	34.4	154 39.7		42.9	21	144 57.6	98 39.6	27.1	50 55.9	26.8	126 42.6	34.6	169 42.0	42.8	Atria	107 12.8	S69 03.9													
	22	160 00.0	113 39.1	28.0	65 57.0	26.7	141 44.5	34.8	184 44.2		42.7	23	175 02.5	128 38.6	29.0	80 58.1	26.7	156 46.4	35.1	199 46.4	42.6	Avior	234 15.1	S59 35.3													
	01	190 05.0	143 38.1 N18 29.9	95 59.2 N25 26.6	171 48.3 N 6 35.3	214 48.6 S11 42.5	Canopus	263 53.1	S52 42.7		02	205 07.4	158 37.6	30.9	111 00.2	26.5	186 50.2	35.5	229 50.8	42.5	Capella	280 24.3	N46 01.4														
	03	220 09.9	173 37.2	31.8	126 01.3	26.5	201 52.2	35.7	244 53.0		42.4	04	235 12.4	188 36.7	32.8	141 02.4	26.4	216 54.1	36.0	259 55.3	42.3	Deneb	49 27.0	N45 21.4													
	05	265 17.3	218 35.7	34.6	156 03.5	26.4	231 56.0	36.2	274 57.5		42.2	06	280 19.7	233 35.2 N18 35.6	186 05.6 N25 26.2	261 59.8 N 6 36.7	305 01.9 S11 42.0	Denebola	182 26.1	N14 26.5																	
	08	310 24.7	263 34.2	37.5	171 04.6	26.3	246 57.9	36.4	289 59.7		42.1	09	325 27.1	278 33.7	38.4	216 07.8	26.1	292 03.6	37.1	335 06.3	41.8	Diphda	348 49.1	S17 51.7													
	10	340 29.6	293 33.2	39.3	216 07.8	26.2	277 01.7	36.9	320 04.1		41.9	11	355 32.1	308 32.7	40.3	231 08.9	26.0	307 05.5	37.3	350 08.6	41.8	Dubhe	193 42.2	N61 37.7													
	12	10 34.5	323 32.2 N18 41.2	276 12.1 N25 25.9	246 09.9	26.0	322 07.4	37.6	5 10.8		41.7	13	25 37.0	338 31.7	42.2	292 03.6	37.1	335 06.3	41.8	Enif	33 40.5	N 9 58.7															
	14	40 39.5	353 31.2	43.1	261 11.0	25.9	337 09.3	37.8	20 13.0		41.6	15	55 41.9	8 30.7	44.0	232 07.4	37.6	5 10.8	41.7	Fomalhaut	15 16.5	S29 30.1															
	16	70 44.4	23 30.2	45.0	276 12.1	25.9	352 11.2	N 6 38.0	35 15.2		S11 41.5	17	85 46.9	38 29.7	45.9	7 13.1	38.3	50 17.4	41.4	Gacrux	171 52.7	S57 14.6															
	18	100 49.3	53 29.2 N18 46.8	6 18.5 N25 25.5	291 13.2	25.8	7 13.1	38.3	50 17.4		41.4	19	115 51.8	68 28.7	47.8	22 15.0	38.5	65 19.7	41.3	Gienah	175 44.8	S17 40.3															
	20	130 54.2	83 28.2	48.7	306 14.2	25.7	22 15.0	38.5	65 19.7		41.3	21	145 56.7	98 27.7	49.6	321 15.3	25.7	37 16.9	38.7	80 21.9	41.2	Hadar	148 37.5	S60 29.0													
	22	160 59.2	113 27.2	50.5	321 15.3	25.7	37 16.9	38.7	80 21.9		41.2	23	176 01.6	128 26.7	51.5	336 16.4	25.6	52 18.8	38.9	95 24.1	41.1	Hamal	327 53.2	N23 34.2													
01	191 04.1	143 26.2 N18 52.4	96 25.0 N25 25.1	351 17.5	25.5	67 20.7	39.2	110 26.3	41.1	02	206 06.6	158 25.7	53.3	356 16.4	25.6	52 18.8	38.9	95 24.1	41.1	Kaus Aust.	83 34.4	S34 22.4															
03	221 09.0	173 25.2	54.2	6 18.5	25.5	82 22.6	N 6 39.4	125 28.5	S11 41.0	04	236 11.5	188 24.7	55.2	8 30.7	44.0	321 15.3	25.7	37 16.9	38.7	Kochab	137 18.7	N74 03.4															
05	266 16.4	218 23.7	57.0	21 19.6	25.4	97 24.5	39.6	140 30.8	40.9	06	281 18.9	233 23.2 N18 57.9	186 31.4 N25 24.7	21 19.6	25.4	97 24.5	39.6	140 30.8	40.9	Markab	13 31.7	N15 19.6															
07	296 21.3	248 22.7	58.9	36 20.7	25.3	112 26.4	39.9	155 33.0	40.8	08	311 23.8	263 22.2	18 59.8	36 20.7	25.3	112 26.4	39.9	155 33.0	40.8	Menkar	314 08.0	N 4 10.7															
09	326 26.3	278 21.7	19 00.7	51 21.8	25.3	127 28.3	40.1	170 35.2	40.7	10	341 28.7	293 21.1	01.6	51 21.8	25.3	127 28.3	40.1	170 35.2	40.7	Menkent	147 59.0	S36 29.1															
11	356 31.2	308 20.6	02.5	66 22.8	25.2	142 30.2	40.3	185 37.4	40.6	12	11 33.7	323 20.1 N19 03.5	276 37.8 N25 24.2	66 22.8	25.2	142 30.2	40.3	185 37.4	40.6	Miaplacidus	221 38.1	S69 48.9															
13	26 36.1	338 19.6	04.4	81 23.9	25.1	157 32.1	40.5	200 39.6	40.5	14	41 38.6	353 19.1	05.3	81 23.9	25.1	157 32.1	40.5	200 39.6	40.5	221 38.1	S69 48.9																
15	56 41.1	8 18.6	06.2	96 25.0	25.1	172 34.0	N 6 40.8	215 41.8	S11 40.4	16	71 43.5	23 18.1	07.1	96 25.0	25.1	172 34.0	N 6 40.8	215 41.8	S11 40.4	Mirfak	308 30.8	N49 56.6															
17	86 46.0	38 17.6	08.0	111 26.1	25.0	187 35.9	41.0	230 44.1	40.4	18	101 48.5	53 17.1 N19 08.9	6 44.3 N25 23.8	111 26.1	25.0	187 35.9	41.0	230 44.1	40.4	Nunki	75 49.6	N26 16.1															
19	116 50.9	68 16.6	09.8	126 27.1	24.9	202 37.8	41.2	245 46.3	40.3	20	131 53.4	83 16.1	10.8	126 27.1	24.9	202 37.8	41.2	245 46.3	40.3	Peacock	53 08.3	S56 39.5															
21	146 55.8	98 15.6	11.7	141 28.2	24.9	217 39.7	41.5	260 48.5	40.2	22	161 58.3	113 15.1	12.6	141 28.2	24.9	217 39.7	41.5	260 48.5	40.2	Pollux	243 19.0	N27 58.3															
23	177 00.8	128 14.5	13.5	156 29.3	24.8	232 41.7	41.7	275 50.7	40.1	01	191 04.1	143 26.2 N18 52.4	96 25.0 N25 25.1	156 29.3	24.8	232 41.7	41.7	275 50.7	40.1	Procyon	244 52.3	N 5 09.9															
															02	206 06.6	158 25.7	53.3	171 04.6	26.3	246 57.9	36.4	289 59.7	42.1	03	236 11.5	188 24.7	55.2	141 28.2	24.9	217 39.7	41.5	260 48.5	40.2	Rasalhague	95 59.8	N12 32.4
															04	250 14.8	203 36.2	33.7	216 07.8	26.2	277 01.7	36.9	320 04.1	41.9	05	265 17.3	218 35.7	34.6	156 03.5	26.4	231 56.0	36.2	274 57.5	42.2	Regulus	207 35.8	N11 51.2
															06	280 19.7	233 35.2 N18 35.6	186 05.6 N25 26.2	261 59.8 N 6 36.7	305 01.9 S11 42.0	07	295 22.2	248 34.7	36.5	201 06.7	26.2	277 01.7	36.9	320 04.1	41.9	Rigel	281 05.4	S 8 10.6				
															08	310 24.7	263 34.2	37.5	216 07.8	26.1	292 03.6	37.1	335 06.3	41.8	09	325 27.1	278 33.7	38.4	231 08.9	26.0	307 05.5	37.3	350 08.6	41.8	Rigel Kent.	139 41.8	S60 55.7
															10	340 29.6	293 33.2	39.3	246 09.9	26.0	322 07.4	37.6	5 10.8	41.7	11	355 32.1	308 32.7	40.3	261 11.0	25.9	337 09.3	37.8	20 13.0	41.6	Sabik	102 04.3	S15 45.3
															12	10 34.5	323 32.2 N18 41.2	276 12.1 N25 25.9	352 11.2 N 6 38.0	35 15.2 S11 41.5	13	25 37.0	338 31.7	42.2	291 13.2	25.8	7 13.1	38.3	50 17.4	41.4	Schedar	349 33.3	N56 39.7				
															14	40 39.5	353 31.2	43.1	306 14.2	25.7	22 15.0	38.5	65 19.7	41.3	15	56 41.1	8 18.6	06.2	321 41.1	24.0	38 02.6	44.2	51 10.7	39.3	Shaula	96 12.2	S37 07.2
															16	71 43.5	23 18.1	07.1	336 42.1	24.0	53 04.5	44.4	96 17.4	39.1	17	86 46.0	38 17.6	08.0	351 43.2	23.9	68 06.4	44.7	111 19.6	39.0	Sirius	258 27.6	S16 45.1
															18	101 48.5	53 17.1 N19 08.9	6 44.3 N25 23.8	83 08.3 N 6 44.9	126 21.8 S11 38.9	19	116 50.9	68 16.6	09.8	21 45.3	23.8	98 10.2	45.1	141 24.0	38.8	Spica	158 23.5	S11 17.0				
															20	131 53.4	83 16.1	10.8	36 46.4	23.7	113 12.1	45.3	156 26.2	38.7	21	146 55.8	98 15.6	11.7	51 47.5	23.6	128 14.0	45.6	171 28.5	38.6	Suhail	222 47.2	S43 31.8
															22	161 58.3	113 15.1	12.6	66 48.5	23.5	143 15.9	45.8	186 30.7	38.6	23	177 00.8	128 14.5	13.5	81 49.6	23.5	158 17.8	46.0	201 32.9	38.5	Vega	80 34.2	N38 47.9
															23	177 00.8	128 14.5	13.5	81 49.6	23.5	158 17.8	46.0	201 32.9	38.5	SHA			Mer. Pass.			Venus	313 33.2	14 26				
															h m			v −0.5 d 0.9			v 1.1 d 0.1			v 1.9 d 0.2			v 2.2 d 0.1			Mars	265 54.2	17 35					
															Mer. Pass. 11 17.8															Jupiter	341 43.4	12 31					
																														Saturn	24 43.6	9 39					

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	ν	Dec	d	HP	Naut.		Civil	1		2	3	4		
d h	° /	° /	° /	/	° /	/	/	°	h m	h m	h m	h m	h m	h m	h m	h m	
SATURDAY	100	178 58.9 N 4 21.3	52 27.7 13.1	N21	59.0 9.0	54.2		N 72	01 29	03 37	04 52		11 36	14 08	16 14		
	01	193 59.1 22.3	66 59.8 13.1	21	50.0 9.2	54.2		N 70	02 15	03 54	05 00		12 17	14 25	16 20		
	02	208 59.3 23.2	81 31.9 13.2	21	40.8 9.2	54.2		68	02 44	04 07	05 06	10 26	12 44	14 38	16 25		
	03	223 59.4 24.2	96 04.1 13.2	21	31.6 9.3	54.2		66	03 06	04 18	05 12	11 09	13 04	14 49	16 29		
	04	238 59.6 25.2	110 36.3 13.4	21	22.3 9.3	54.2		64	03 22	04 26	05 16	11 38	13 21	14 58	16 32		
	05	253 59.8 26.1	125 08.7 13.3	21	13.0 9.5	54.2		62	03 36	04 34	05 20	12 00	13 34	15 05	16 35		
	06	269 00.0 N 4 27.1	139 41.0 13.4	N21	03.5 9.6	54.2		60	03 47	04 40	05 23	12 17	13 46	15 12	16 37		
	07	284 00.2 28.1	154 13.4 13.5	20	53.9 9.7	54.2		N 58	03 56	04 46	05 26	12 32	13 55	15 18	16 40		
	08	299 00.4 29.0	168 45.9 13.5	20	44.2 9.7	54.2		56	04 04	04 51	05 29	12 44	14 04	15 23	16 42		
	09	314 00.6 30.0	183 18.4 13.6	20	34.5 9.8	54.2		54	04 11	04 55	05 31	12 55	14 11	15 27	16 43		
	10	329 00.7 31.0	197 51.0 13.7	20	24.7 10.0	54.2		52	04 18	04 59	05 33	13 05	14 18	15 31	16 45		
	11	344 00.9 31.9	212 23.7 13.7	20	14.7 10.0	54.2		50	04 23	05 03	05 35	13 13	14 24	15 35	16 46		
	12	359 01.1 N 4 32.9	226 56.4 13.7	N20	04.7 10.1	54.2		45	04 35	05 10	05 40	13 31	14 37	15 43	16 49		
	13	14 01.3 33.9	241 29.1 13.8	19	54.6 10.2	54.2		N 40	04 43	05 16	05 43	13 46	14 48	15 50	16 52		
	14	29 01.5 34.8	256 01.9 13.9	19	44.4 10.2	54.2		35	04 51	05 21	05 46	13 58	14 57	15 56	16 54		
	15	44 01.7 35.8	270 34.8 13.9	19	34.2 10.4	54.3		30	04 56	05 25	05 49	14 09	15 05	16 01	16 56		
	16	59 01.9 36.8	285 07.7 13.9	19	23.8 10.4	54.3		20	05 05	05 31	05 53	14 27	15 19	16 09	17 00		
	17	74 02.0 37.7	299 40.6 14.0	19	13.4 10.6	54.3		N 10	05 11	05 36	05 57	14 43	15 31	16 17	17 03		
	18	89 02.2 N 4 38.7	314 13.6 14.1	N19	02.8 10.6	54.3		0	05 16	05 40	06 00	14 58	15 42	16 24	17 05		
	19	104 02.4 39.6	328 46.7 14.1	18	52.2 10.6	54.3		S 10	05 18	05 43	06 04	15 13	15 53	16 31	17 08		
	20	119 02.6 40.6	343 19.8 14.2	18	41.6 10.8	54.3		20	05 20	05 45	06 07	15 29	16 05	16 38	17 11		
	21	134 02.8 41.6	357 53.0 14.2	18	30.8 10.8	54.3		30	05 19	05 47	06 11	15 47	16 18	16 47	17 14		
	22	149 03.0 42.5	12 26.2 14.2	18	20.0 11.0	54.3		35	05 19	05 48	06 13	15 57	16 26	16 52	17 16		
	23	164 03.2 43.5	26 59.4 14.4	18	09.0 11.0	54.3		40	05 17	05 49	06 16	16 09	16 34	16 57	17 19		
SUNDAY	00	179 03.3 N 4 44.5	41 32.8 14.3	N17	58.0 11.0	54.3		S 50	05 12	05 49	06 22	16 40	16 57	17 11	17 24		
	01	194 03.5 45.4	56 06.1 14.4	17	47.0 11.2	54.3		52	05 10	05 49	06 23	16 48	17 03	17 15	17 25		
	02	209 03.7 46.4	70 39.5 14.5	17	35.8 11.2	54.3		54	05 08	05 49	06 25	16 57	17 09	17 19	17 27		
	03	224 03.9 47.4	85 13.0 14.5	17	24.6 11.3	54.4		56	05 06	05 49	06 27	17 07	17 16	17 23	17 29		
	04	239 04.1 48.3	99 46.5 14.5	17	13.3 11.4	54.4		58	05 04	05 49	06 29	17 18	17 24	17 27	17 30		
	05	254 04.3 49.3	114 20.0 14.6	17	01.9 11.5	54.4		S 60	05 01	05 49	06 31	17 31	17 32	17 33	17 33		
	06	269 04.5 N 4 50.2	128 53.6 14.6	N16	50.4 11.5	54.4		Lat.	Sunset	Twilight		Moonset					
	07	284 04.6 51.2	143 27.2 14.7	16	38.9 11.6	54.4	Civil			Naut.	1	2	3	4			
	08	299 04.8 52.2	158 00.9 14.7	16	27.3 11.7	54.4		°	h m	h m	h m	h m	h m	h m	h m	h m	
	09	314 05.0 53.1	172 34.6 14.8	16	15.6 11.7	54.4		N 72	19 18	20 35	22 51		07 47	06 45	06 07		
	10	329 05.2 54.1	187 08.4 14.8	16	03.9 11.8	54.4		N 70	19 10	20 17	21 59		07 05	06 26	05 58		
	11	344 05.4 55.0	201 42.2 14.9	15	52.1 11.9	54.4		68	19 03	20 03	21 28	07 22	06 36	06 11	05 51		
	12	359 05.6 N 4 56.0	216 16.1 14.9	N15	40.2 11.9	54.5		66	18 58	19 52	21 05	06 38	06 14	05 58	05 45		
	13	14 05.7 57.0	230 50.0 14.9	15	28.3 12.0	54.5		64	18 53	19 43	20 48	06 08	05 57	05 48	05 39		
	14	29 05.9 57.9	245 23.9 15.0	15	16.3 12.1	54.5		62	18 49	19 35	20 34	05 46	05 42	05 39	05 35		
	15	44 06.1 58.9	259 57.9 15.0	14	52.0 12.2	54.5		60	18 45	19 29	20 23	05 27	05 30	05 31	05 31		
	16	59 06.3 59.9	274 31.9 15.0	14	39.8 12.3	54.5		N 58	18 42	19 23	20 13	05 12	05 19	05 24	05 27		
	17	74 06.5 50.8	289 05.9 15.1	N14	27.5 12.3	54.5		56	18 40	19 18	20 05	04 59	05 10	05 18	05 24		
	18	89 06.7 N 5 01.8	303 40.0 15.1	14	15.2 12.4	54.5		54	18 37	19 13	19 57	04 48	05 02	05 12	05 21		
	19	104 06.9 02.7	318 14.1 15.2	14	02.8 12.5	54.6		52	18 35	19 09	19 51	04 38	04 54	05 08	05 19		
	20	119 07.0 03.7	332 48.3 15.2	13	50.3 12.5	54.6		50	18 33	19 06	19 45	04 28	04 48	05 03	05 16		
	21	134 07.2 04.7	347 22.5 15.2	13	37.8 12.6	54.6		45	18 29	18 58	19 34	04 09	04 33	04 53	05 11		
	MONDAY	00	179 07.8 N 5 07.5	31 05.2 15.4	N13	12.6 12.7	54.6		N 40	18 25	18 52	19 25	03 54	04 21	04 45	05 07	
		01	194 08.0 08.5	45 39.6 15.3	12	59.9 12.8	54.6		35	18 22	18 47	19 17	03 40	04 11	04 38	05 03	
02		209 08.1 09.5	60 13.9 15.4	12	47.1 12.8	54.6		30	18 19	18 43	19 11	03 29	04 02	04 32	05 00		
03		224 08.3 10.4	74 48.3 15.4	12	34.3 12.9	54.7		20	18 14	18 37	19 02	03 09	03 46	04 21	04 54		
04		239 08.5 11.4	89 22.7 15.4	12	21.4 12.9	54.7		N 10	18 11	18 32	18 56	02 51	03 32	04 11	04 49		
05		254 08.7 12.3	103 57.1 15.5	12	08.5 13.0	54.7		0	18 07	18 28	18 52	02 35	03 19	04 02	04 44		
06		269 08.9 N 5 13.3	118 31.6 15.5	N11	55.5 13.1	54.7		S 10	18 03	18 24	18 49	02 18	03 06	03 53	04 39		
07		284 09.1 14.2	133 06.1 15.5	11	42.4 13.1	54.7		20	18 00	18 22	18 47	02 00	02 52	03 43	04 33		
08		299 09.2 15.2	147 40.6 15.6	11	29.3 13.1	54.7		30	17 56	18 20	18 47	01 40	02 36	03 32	04 27		
09		314 09.4 16.2	162 15.2 15.5	11	16.2 13.2	54.7		35	17 54	18 19	18 48	01 27	02 27	03 25	04 24		
10		329 09.6 17.1	176 49.7 15.6	11	03.0 13.3	54.8		40	17 51	18 18	18 49	01 13	02 16	03 18	04 20		
11		344 09.8 18.1	191 24.3 15.7	10	49.7 13.3	54.8		45	17 48	18 17	18 51	00 57	02 03	03 09	04 15		
12		359 10.0 N 5 19.0	205 59.0 15.6	N10	36.4 13.3	54.8		S 50	17 45	18 17	18 54	00 36	01 47	02 58	04 09		
13		14 10.2 20.0	220 33.6 15.7	10	23.1 13.4	54.8		52	17 43	18 17	18 56	00 26	01 40	02 53	04 07		
14		29 10.3 20.9	235 08.3 15.6	10	09.7 13.5	54.8		54	17 41	18 17	18 58	00 15	01 32	02 48	04 04		
15		44 10.5 21.9	249 42.9 15.7	9	56.2 13.5	54.8		56	17 40	18 17	19 00	00 02	01 22	02 42	04 01		
16		59 10.7 22.9	264 17.6 15.8	9	42.7 13.5	54.9		58	17 38	18 17	19 02	25 12	01 12	02 35	03 57		
17		74 10.9 23.8	278 52.4 15.7	9	29.2 13.6	54.9		S 60	17 35	18 17	19 05	25 00	01 00	02 27	03 53		
18		89 11.1 N 5 24.8	293 27.1 15.8	N 9	15.6 13.6	54.9		Day	SUN			MOON					
19		104 11.3 25.7	308 01.9 15.7	9	02.0 13.7	54.9	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase				
20		119 11.4 26.7	322 36.6 15.8	8	48.3 13.7	54.9	00 ^h 12 ^h	Pass.	Upper	Lower	d	%					
21		134 11.6 27.6	337 11.4 15.8	8	34.6 13.8	54.9	d	m s	m s	h m	h m	h m					
22		149 11.8 28.6	351 46.2 15.8	8	20.8 13.8	55.0	1	04 05	03 56	12 04	21 09	08 46		11 80			
23		164 12.0 29.6	6 21.0 15.8	N 8	07.0 13.9	55.0	2	03 47	03 38	12 04	21 52	09 31		12 87			
	SD 16.0	d 1.0	SD	14.8	14.8	14.9	3	03 29	03 20	12 03	22 34	10 13	1				

UT	ARIES		VENUS −4.0		MARS +1.0		JUPITER −2.0		SATURN +0.9		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
TUESDAY	4 00	192 03.2	143 14.0	N19 14.4	96 50.7	N25 23.4	173 19.7	N 6 46.3	216 35.1	S11 38.4	Acamar	315 13.3	S40 12.9
	01	207 05.7	158 13.5	15.3	111 51.7	23.3	188 21.6	46.5	231 37.4	38.3	Achernar	335 21.8	S57 07.3
	02	222 08.2	173 13.0	16.2	126 52.8	23.3	203 23.5	46.7	246 39.6	38.2	Acrux	173 01.1	S63 13.7
	03	237 10.6	188 12.5	17.1	141 53.9	23.2	218 25.4	46.9	261 41.8	38.1	Adhara	255 07.0	S29 00.4
	04	252 13.1	203 12.0	18.0	156 54.9	23.1	233 27.3	47.2	276 44.0	38.0	Aldebaran	290 41.5	N16 33.3
	05	267 15.6	218 11.5	18.9	171 56.0	23.0	248 29.2	47.4	291 46.2	37.9			
	06	282 18.0	233 11.0	N19 19.8	186 57.1	N25 23.0	263 31.1	N 6 47.6	306 48.5	S11 37.9	Alioth	166 13.7	N55 50.0
	07	297 20.5	248 10.4	20.7	201 58.1	22.9	278 33.0	47.9	321 50.7	37.8	Alkaid	152 52.7	N49 11.7
	08	312 22.9	263 09.9	21.6	216 59.2	22.8	293 34.9	48.1	336 52.9	37.7	Alnair	27 35.1	S46 50.9
	09	327 25.4	278 09.4	22.5	232 00.3	22.7	308 36.8	48.3	351 55.1	37.6	Alnilam	275 39.3	S 1 11.3
	10	342 27.9	293 08.9	23.4	247 01.3	22.7	323 38.7	48.5	6 57.3	37.5	Alphard	217 49.0	S 8 45.7
	11	357 30.3	308 08.4	24.3	262 02.4	22.6	338 40.6	48.8	21 59.6	37.4			
	12	12 32.8	323 07.9	N19 25.2	277 03.5	N25 22.5	353 42.6	N 6 49.0	37 01.8	S11 37.4	Alphecca	126 04.7	N26 38.0
	13	27 35.3	338 07.4	26.1	292 04.5	22.5	8 44.5	49.2	52 04.0	37.3	Alpheratz	357 36.7	N29 12.9
	14	42 37.7	353 06.8	27.0	307 05.6	22.4	23 46.4	49.5	67 06.2	37.2	Altair	62 01.5	N 8 55.5
	15	57 40.2	8 06.3	27.9	322 06.7	22.3	38 48.3	49.7	82 08.5	37.1	Ankaa	353 09.0	S42 10.9
	16	72 42.7	23 05.8	28.8	337 07.7	22.2	53 50.2	49.9	97 10.7	37.0	Antares	112 17.4	S26 29.0
	17	87 45.1	38 05.3	29.7	352 08.8	22.2	68 52.1	50.1	112 12.9	36.9			
	18	102 47.6	53 04.8	N19 30.6	7 09.9	N25 22.1	83 54.0	N 6 50.4	127 15.1	S11 36.8	Arcturus	145 48.9	N19 03.6
	19	117 50.1	68 04.3	31.5	22 10.9	22.0	98 55.9	50.6	142 17.4	36.8	Atria	107 12.7	S69 03.9
	20	132 52.5	83 03.7	32.4	37 12.0	21.9	113 57.8	50.8	157 19.6	36.7	Avior	234 15.1	S59 35.3
	21	147 55.0	98 03.2	33.3	52 13.0	21.8	128 59.7	51.1	172 21.8	36.6	Bellatrix	278 24.6	N 6 22.2
	22	162 57.4	113 02.7	34.1	67 14.1	21.8	144 01.6	51.3	187 24.0	36.5	Betelgeuse	270 53.8	N 7 24.6
	23	177 59.9	128 02.2	35.0	82 15.2	21.7	159 03.5	51.5	202 26.2	36.4			
WEDNESDAY	5 00	193 02.4	143 01.7	N19 35.9	97 16.2	N25 21.6	174 05.4	N 6 51.7	217 28.5	S11 36.3	Canopus	263 53.1	S52 42.7
	01	208 04.8	158 01.2	36.8	112 17.3	21.5	189 07.3	52.0	232 30.7	36.2	Capella	280 24.3	N46 01.4
	02	223 07.3	173 00.6	37.7	127 18.4	21.5	204 09.2	52.2	247 32.9	36.2	Deneb	49 27.0	N45 21.4
	03	238 09.8	188 00.1	38.6	142 19.4	21.4	219 11.1	52.4	262 35.1	36.1	Denebola	182 26.2	N14 26.5
	04	253 12.2	202 59.6	39.5	157 20.5	21.3	234 13.0	52.6	277 37.4	36.0	Diphda	348 49.1	S17 51.7
	05	268 14.7	217 59.1	40.3	172 21.6	21.2	249 14.9	52.9	292 39.6	35.9			
	06	283 17.2	232 58.5	N19 41.2	187 22.6	N25 21.2	264 16.8	N 6 53.1	307 41.8	S11 35.8	Dubhe	193 42.2	N61 37.7
	07	298 19.6	247 58.0	42.1	202 23.7	21.1	279 18.7	53.3	322 44.0	35.7	Einath	278 03.9	N28 37.6
	08	313 22.1	262 57.5	43.0	217 24.7	21.0	294 20.6	53.6	337 46.3	35.6	Eltanin	90 42.7	N51 28.8
	09	328 24.5	277 57.0	43.9	232 25.8	20.9	309 22.5	53.8	352 48.5	35.6	Enif	33 40.5	N 9 58.7
	10	343 27.0	292 56.5	44.7	247 26.9	20.8	324 24.4	54.0	7 50.7	35.5	Fomalhaut	15 16.4	S29 30.0
	11	358 29.5	307 55.9	45.6	262 27.9	20.8	339 26.3	54.2	22 52.9	35.4			
	12	13 31.9	322 55.4	N19 46.5	277 29.0	N25 20.7	354 28.2	N 6 54.5	37 55.2	S11 35.3	Gacrux	171 52.7	S57 14.6
	13	28 34.4	337 54.9	47.4	292 30.0	20.6	9 30.1	54.7	52 57.4	35.2	Gienah	175 44.8	S17 40.3
	14	43 36.9	352 54.4	48.2	307 31.1	20.5	24 32.0	54.9	67 59.6	35.1	Hadar	148 37.5	S60 29.0
	15	58 39.3	7 53.8	49.1	322 32.2	20.4	39 33.9	55.2	83 01.8	35.1	Hamal	327 53.2	N23 34.2
	16	73 41.8	22 53.3	50.0	337 33.2	20.4	54 35.8	55.4	98 04.0	35.0	Kaus Aust.	83 34.4	S34 22.4
	17	88 44.3	37 52.8	50.9	352 34.3	20.3	69 37.7	55.6	113 06.3	34.9			
	18	103 46.7	52 52.3	N19 51.7	7 35.3	N25 20.2	84 39.6	N 6 55.8	128 08.5	S11 34.8	Kochab	137 18.7	N74 03.4
	19	118 49.2	67 51.7	52.6	22 36.4	20.1	99 41.5	56.1	143 10.7	34.7	Markab	13 31.7	N15 19.6
	20	133 51.7	82 51.2	53.5	37 37.5	20.0	114 43.4	56.3	158 12.9	34.6	Menkar	314 08.0	N 4 10.7
	21	148 54.1	97 50.7	54.3	52 38.5	20.0	129 45.3	56.5	173 15.2	34.5	Menkent	147 59.0	S36 29.1
	22	163 56.6	112 50.2	55.2	67 39.6	19.9	144 47.2	56.8	188 17.4	34.5	Miaplacidus	221 38.1	S69 48.9
	23	178 59.0	127 49.6	56.1	82 40.6	19.8	159 49.1	57.0	203 19.6	34.4			
THURSDAY	6 00	194 01.5	142 49.1	N19 57.0	97 41.7	N25 19.7	174 51.0	N 6 57.2	218 21.8	S11 34.3	Mirfak	308 30.8	N49 56.6
	01	209 04.0	157 48.6	57.8	112 42.7	19.6	189 52.9	57.4	233 24.1	34.2	Nunki	75 49.6	S26 16.1
	02	224 06.4	172 48.1	58.7	127 43.8	19.5	204 54.8	57.7	248 26.3	34.1	Peacock	53 08.2	S56 39.5
	03	239 08.9	187 47.5	19 59.5	142 44.9	19.5	219 56.7	57.9	263 28.5	34.0	Pollux	243 19.1	N27 58.3
	04	254 11.4	202 47.0	20 00.4	157 45.9	19.4	234 58.6	58.1	278 30.8	34.0	Procyon	244 52.3	N 5 09.9
	05	269 13.8	217 46.5	01.3	172 47.0	19.3	250 00.5	58.3	293 33.0	33.9			
	06	284 16.3	232 45.9	N20 02.1	187 48.0	N25 19.2	265 02.4	N 6 58.6	308 35.2	S11 33.8	Rasalhague	95 59.8	N12 32.4
	07	299 18.8	247 45.4	03.0	202 49.1	19.1	280 04.4	58.8	323 37.4	33.7	Regulus	207 35.8	N11 51.2
	08	314 21.2	262 44.9	03.9	217 50.2	19.1	295 06.3	59.0	338 39.7	33.6	Rigel	281 05.4	S 8 10.6
	09	329 23.7	277 44.3	04.7	232 51.2	19.0	310 08.2	59.3	353 41.9	33.5	Rigel Kent.	139 41.8	S60 55.8
	10	344 26.2	292 43.8	05.6	247 52.3	18.9	325 10.1	59.5	8 44.1	33.4	Sabik	102 04.3	S15 45.3
	11	359 28.6	307 43.3	06.4	262 53.3	18.8	340 12.0	59.7	23 46.3	33.4			
	12	14 31.1	322 42.8	N20 07.3	277 54.4	N25 18.7	355 13.9	N 6 59.9	38 48.6	S11 33.3	Schedar	349 33.3	N56 39.7
	13	29 33.5	337 42.2	08.1	292 55.4	18.6	10 15.8	7 00.2	53 50.8	33.2	Shaula	96 12.2	S37 07.2
	14	44 36.0	352 41.7	09.0	307 56.5	18.5	25 17.7	00.4	68 53.0	33.1	Sirius	258 27.6	S16 45.0
	15	59 38.5	7 41.2	09.8	322 57.5	18.5	40 19.6	00.6	83 55.2	33.0	Spica	158 23.5	S11 17.0
	16	74 40.9	22 40.6	10.7	337 58.6	18.4	55 21.5	00.9	98 57.5	32.9	Suhail	222 47.2	S43 31.8
	17	89 43.4	37 40.1	11.6	352 59.7	18.3	70 23.4	01.1	113 59.7	32.9			
	18	104 45.9	52 39.6	N20 12.4	8 00.7	N25 18.2	85 25.3	N 7 01.3	129 01.9	S11 32.8	Vega	80 34.2	N38 48.0
	19	119 48.3	67 39.0	13.3	23 01.8	18.1	100 27.2	01.5	144 04.1	32.7	Zuben'ubi	136 57.4	S16 08.4
	20	134 50.8	82 38.5	14.1	38 02.8	18.0	115 29.1	01.8	159 06.4	32.6			
	21	149 53.3	97 38.0	15.0	53 03.9	17.9	130 31.0	02.0	174 08.6	32.5		SHA	Mer. Pass
	22	164 55.7	112 37.4	15.8	68 04.9	17.9	145 32.9	02.2	189 10.8	32.4	Venus	309 59.3	14 28
	23	179 58.2	127 36.9	16.6	83 06.0	17.8	160 34.8	02.4	204 13.1	32.4	Mars	264 13.9	17 30
		h m									Jupiter	341 03.0	12 22
Mer. Pass. 11 06.0		v −0.5	d 0.9	v 1.1	d 0.1	v 1.9	d 0.2	v 2.2	d 0.1		Saturn	24 26.1	9 29

UT	SUN		MOON					Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	P	Dec	d	HP		Naut.	Civil		4	5	6	7	
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	
TUESDAY	4 00	179 12.2 N 5 30.5	20 55.8 15.9 N	7 53.1 13.9	55.0			N 72	00 27	03 18	04 36	16 14	18 17	20 27	23 06	
	01	194 12.4 . 31.5	35 30.7 15.8	7 39.2 13.9	55.0			N 70	01 48	03 37	04 46	16 20	18 14	20 13	22 29	
	02	209 12.5 . 32.4	50 05.5 15.9	7 25.3 14.0	55.0			68	02 25	03 53	04 54	16 25	18 11	20 02	22 04	
	03	224 12.7 . . 33.4	64 40.4 15.8	7 11.3 14.0	55.1			66	02 49	04 05	05 00	16 29	18 09	19 52	21 45	
	04	239 12.9 . . 34.3	79 15.2 15.9	6 57.3 14.0	55.1			64	03 08	04 15	05 05	16 32	18 07	19 45	21 29	
	05	254 13.1 . 35.3	93 50.1 15.9	6 43.3 14.1	55.1			62	03 23	04 23	05 10	16 35	18 05	19 38	21 17	
	06	269 13.3 N 5 36.2	108 25.0 15.9 N	6 29.2 14.1	55.1			60	03 36	04 31	05 14	16 37	18 04	19 32	21 06	
	07	284 13.5 . 37.2	122 59.9 15.8	6 15.1 14.1	55.1			N 58	03 46	04 37	05 18	16 40	18 02	19 27	20 57	
	08	299 13.6 . 38.1	137 34.7 15.9	6 01.0 14.2	55.1			56	03 55	04 43	05 21	16 42	18 01	19 23	20 48	
	09	314 13.8 . . 39.1	152 09.6 15.9	5 46.8 14.2	55.2			54	04 03	04 48	05 24	16 43	18 00	19 19	20 41	
	10	329 14.0 . 40.1	166 44.5 15.9	5 32.6 14.3	55.2			52	04 10	04 52	05 27	16 45	17 59	19 15	20 35	
	11	344 14.2 . 41.0	181 19.4 15.9	5 18.3 14.3	55.2			50	04 16	04 56	05 29	16 46	17 58	19 12	20 29	
	12	359 14.4 N 5 42.0	195 54.3 15.9 N	5 04.0 14.3	55.2			45	04 29	05 04	05 34	16 49	17 56	19 05	20 17	
	13	14 14.5 . 42.9	210 29.2 15.9	4 49.7 14.3	55.2			N 40	04 38	05 11	05 38	16 52	17 55	18 59	20 06	
	14	29 14.7 . 43.9	225 04.1 15.9	4 35.4 14.4	55.3			35	04 46	05 16	05 42	16 54	17 53	18 54	19 58	
	15	44 14.9 . . 44.8	239 39.0 15.9	4 21.0 14.4	55.3			30	04 53	05 21	05 45	16 56	17 52	18 50	19 50	
	16	59 15.1 . 45.8	254 13.9 15.9	4 06.6 14.4	55.3			20	05 02	05 28	05 51	17 00	17 50	18 43	19 37	
	17	74 15.3 . 46.7	268 48.8 15.9	3 52.2 14.4	55.3			N 10	05 09	05 34	05 55	17 03	17 49	18 36	19 26	
	18	89 15.5 N 5 47.7	283 23.7 15.8 N	3 37.8 14.5	55.3			0	05 15	05 39	05 59	17 05	17 47	18 30	19 15	
	19	104 15.6 . 48.6	297 58.5 15.9	3 23.3 14.5	55.4			S 10	05 18	05 43	06 04	17 08	17 45	18 24	19 05	
	20	119 15.8 . 49.6	312 33.4 15.8	3 08.8 14.5	55.4			20	05 20	05 46	06 08	17 11	17 44	18 18	18 54	
	21	134 16.0 . . 50.5	327 08.2 15.9	2 54.3 14.6	55.4			30	05 21	05 49	06 13	17 14	17 42	18 10	18 41	
	22	149 16.2 . 51.5	341 43.1 15.8	2 39.7 14.5	55.4			35	05 21	05 50	06 16	17 16	17 41	18 06	18 34	
23	164 16.4 . 52.4	356 17.9 15.9	2 25.2 14.6	55.4			40	05 20	05 52	06 19	17 19	17 40	18 02	18 26		
	164 16.4 . 52.4	356 17.9 15.9	2 25.2 14.6	55.4			45	05 19	05 53	06 22	17 21	17 38	17 56	18 17		
WEDNESDAY	5 00	179 16.5 N 5 53.4	10 52.8 15.8 N	2 10.6 14.6	55.5			S 50	05 17	05 54	06 26	17 24	17 37	17 50	18 05	
	01	194 16.7 . 54.3	25 27.6 15.8	1 56.0 14.7	55.5			52	05 15	05 54	06 28	17 25	17 36	17 47	18 00	
	02	209 16.9 . 55.3	40 02.4 15.8	1 41.3 14.6	55.5			54	05 14	05 55	06 30	17 27	17 35	17 44	17 54	
	03	224 17.1 . . 56.2	54 37.2 15.7	1 26.7 14.7	55.5			56	05 12	05 55	06 33	17 29	17 34	17 40	17 48	
	04	239 17.3 . 57.2	69 11.9 15.8	1 12.0 14.6	55.5			58	05 10	05 56	06 35	17 30	17 33	17 37	17 41	
	05	254 17.4 . 58.1	83 46.7 15.7	0 57.4 14.7	55.6			S 60	05 08	05 56	06 38	17 33	17 32	17 32	17 33	
	06	269 17.6 N 5 59.1	98 21.4 15.7 N	0 42.7 14.7	55.6				Lat.	Sunset	Twilight		Moonset			
	07	284 17.8 . 60.0	112 56.1 15.7	0 28.0 14.7	55.6						Civil	Naut.	4	5	6	7
	08	299 18.0 . 61.0	127 30.8 15.7 N	0 13.3 14.8	55.6											
	09	314 18.2 . . 61.9	142 05.5 15.7 S	0 01.5 14.7	55.6											
	10	329 18.3 . 62.9	156 40.2 15.6	0 16.2 14.8	55.7											
	11	344 18.5 . 63.8	171 14.8 15.6	0 31.0 14.7	55.7											
	12	359 18.7 N 6 04.8	185 49.4 15.6 S	0 45.7 14.8	55.7			N 72	19 32	20 53	////	06 07	05 34	05 02	04 24	
	13	14 18.9 . 05.7	200 24.0 15.6	1 00.5 14.8	55.7			N 70	19 22	20 32	22 26	05 58	05 34	05 09	04 41	
	14	29 19.1 . 06.7	214 58.6 15.5	1 15.3 14.8	55.7			68	19 14	20 16	21 47	05 51	05 33	05 15	04 55	
	15	44 19.2 . . 07.6	229 33.1 15.5	1 30.1 14.7	55.8			66	19 08	20 03	21 20	05 45	05 32	05 20	05 06	
	16	59 19.4 . 08.6	244 07.6 15.5	1 44.8 14.8	55.8			64	19 02	19 53	21 01	05 39	05 32	05 24	05 15	
	17	74 19.6 . 09.5	258 42.1 15.4	1 59.6 14.8	55.8			62	18 57	19 44	20 45	05 35	05 31	05 27	05 23	
	18	89 19.8 N 6 10.5	273 16.5 15.4 S	2 14.4 14.8	55.8			60	18 53	19 37	20 32	05 31	05 31	05 30	05 30	
	19	104 20.0 . 11.4	287 50.9 15.4	2 29.2 14.8	55.9			N 58	18 49	19 30	20 21	05 27	05 30	05 33	05 37	
	20	119 20.1 . 12.4	302 25.3 15.4	2 44.0 14.9	55.9			56	18 46	19 24	20 12	05 24	05 30	05 36	05 42	
	21	134 20.3 . . 13.3	316 59.7 15.3	2 58.9 14.8	55.9			54	18 43	19 19	20 04	05 21	05 30	05 38	05 47	
	22	149 20.5 . 14.3	331 34.0 15.3	3 13.7 14.8	55.9			52	18 40	19 15	19 57	05 19	05 29	05 40	05 52	
23	164 20.7 . 15.2	346 08.3 15.2	3 28.5 14.8	55.9			50	18 38	19 11	19 51	05 16	05 29	05 42	05 56		
THURSDAY	6 00	179 20.9 N 6 16.2	0 42.5 15.2 S	3 43.3 14.8	56.0			45	18 32	19 02	19 38	05 11	05 28	05 46	06 05	
	01	194 21.0 . 17.1	15 16.7 15.2	3 58.1 14.7	56.0			N 40	18 28	18 55	19 28	05 07	05 28	05 49	06 12	
	02	209 21.2 . 18.1	29 50.9 15.1	4 12.8 14.8	56.0			35	18 24	18 50	19 20	05 03	05 27	05 52	06 19	
	03	224 21.4 . . 19.0	44 25.0 15.1	4 27.6 14.8	56.0			30	18 21	18 45	19 13	05 00	05 27	05 55	06 24	
	04	239 21.6 . 19.9	58 59.1 15.0	4 42.4 14.8	56.0			20	18 15	18 37	19 03	04 54	05 26	05 59	06 34	
	05	254 21.8 . 20.9	73 33.1 15.0	4 57.2 14.7	56.1			N 10	18 10	18 32	18 56	04 49	05 26	06 03	06 43	
	06	269 21.9 N 6 21.8	88 07.1 15.0 S	5 11.9 14.8	56.1			0	18 06	18 27	18 51	04 44	05 25	06 07	06 51	
	07	284 22.1 . 22.8	102 41.1 14.9	5 26.7 14.7	56.1			S 10	18 02	18 23	18 47	04 39	05 25	06 11	07 00	
	08	299 22.3 . 23.7	117 15.0 14.9	5 41.4 14.8	56.1			20	17 57	18 19	18 45	04 33	05 24	06 15	07 08	
	09	314 22.5 . . 24.7	131 48.9 14.8	5 56.2 14.7	56.2			30	17 52	18 16	18 44	04 27	05 23	06 20	07 19	
	10	329 22.7 . 25.6	146 22.7 14.8	6 10.9 14.7	56.2			35	17 49	18 15	18 44	04 24	05 23	06 22	07 24	
	11	344 22.8 . 26.6	160 56.5 14.7	6 25.6 14.7	56.2			40	17 46	18 13	18 45	04 20	05 22	06 26	07 31	
	12	359 23.0 N 6 27.5	175 30.2 14.6 S	6 40.3 14.7	56.2			45	17 43	18 12	18 46	04 15	05 21	06 29	07 39	
	13	14 23.2 . 28.5	190 03.8 14.7	6 55.0 14.6	56.2			S 50	17 38	18 11	18 48	04 09	05 21	06 33	07 49	
	14	29 23.4 . 29.4	204 37.5 14.5	7 09.6 14.6	56.3			52	17 36	18 10	18 49	04 07	05 20	06 35	07 53	
	15	44 23.5 . . 30.3	219 11.0 14.5	7 24.2 14.7	56.3			54	17 34	18 10	18 50	04 04	05 20	06 37	07 58	
	16	59 23.7 . 31.3	233 44.5 14.5	7 38.9 14.5	56.3			56	17 32	18 09	18 52	04 01	05 19	06 40	08 03	
	17	74 23.9 . 32.2	248 18.0 14.4	7 53.4 14.6	56.3			58	17 29	18 08	18 54	03 57	05 19	06 43	08 09	
	18	89 24.1 N 6 33.2	262 51.4 14.3 S	8 08.0 14.6	56.4			S 60	17 26	18 08	18 56	03 53	05 18	06 46	08 16	
	19	104 24.3 . 34.1	277 24.7 14.3	8 22.6 14.5	56.4					SUN		MOON				
	20	119 24.4 . 35.1	291 58.0 14.3	8 37.1 14.5	56.4			Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
	21	134 24.6 . . 36.0	306 31.3 14.1	8 51.6 14.5	56.4				00 ^h 12 ^h		Pass.	Upper	Lower			
	22	149 24.8 . 36.9	321 04.4 14.1	9 06.1 14.4	56.4			d	m s	m s	h m	h m	h m	d %		
23	164 25.0 . 37.9	335 37.5 14.1 S	9 20.5 14.4	56.5			4	03 12	03 03	12 03	23 15	10 55	14 97			
							5	02 54	02 46	12 03	23 57	11 36	15 99			
							6	02 37	02 28	12 02	24 41	12 19	16 100			



UT	ARIES		VENUS -4.0		MARS +1.1		JUPITER -2.0		SATURN +0.9		STARS			
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
F R I D A Y	7 00	195 00.6	142 36.4	N20 17.5	98 07.0	N25 17.7	175 36.7	N 7 02.7	219 15.3	S11 32.3		Acamar	315 13.3	S40 12.9
	01	210 03.1	157 35.8	18.3	113 08.1	17.6	190 38.6	02.9	234 17.5	32.2		Achernar	335 21.9	S57 07.3
	02	225 05.6	172 35.3	19.2	128 09.1	17.5	205 40.5	03.1	249 19.7	32.1		Acrux	173 01.1	S63 13.7
	03	240 08.0	187 34.7	20.0	143 10.2	17.4	220 42.4	03.4	264 22.0	32.0		Adhara	255 07.1	S29 00.4
	04	255 10.5	202 34.2	20.9	158 11.2	17.3	235 44.3	03.6	279 24.2	31.9		Aldebaran	290 41.5	N16 33.3
	05	270 13.0	217 33.7	21.7	173 12.3	17.2	250 46.2	03.8	294 26.4	31.9				
	06	285 15.4	232 33.1	N20 22.5	188 13.3	N25 17.2	265 48.1	N 7 04.0	309 28.7	S11 31.8		Alioth	166 13.7	N55 50.0
	07	300 17.9	247 32.6	23.4	203 14.4	17.1	280 50.0	04.3	324 30.9	31.7		Alkaid	152 52.7	N49 11.7
	08	315 20.4	262 32.1	24.2	218 15.5	17.0	295 51.9	04.5	339 33.1	31.6		Alnair	27 35.1	S46 50.9
	09	330 22.8	277 31.5	25.1	233 16.5	16.9	310 53.8	04.7	354 35.3	31.5		Alnilam	275 39.4	S 1 11.3
	10	345 25.3	292 31.0	25.9	248 17.6	16.8	325 55.7	04.9	9 37.6	31.4		Alphard	217 49.0	S 8 45.7
	11	0 27.8	307 30.4	26.7	263 18.6	16.7	340 57.6	05.2	24 39.8	31.4				
	12	15 30.2	322 29.9	N20 27.6	278 19.7	N25 16.6	355 59.5	N 7 05.4	39 42.0	S11 31.3		Alphecca	126 04.7	N26 38.0
	13	30 32.7	337 29.4	28.4	293 20.7	16.5	11 01.4	05.6	54 44.2	31.2		Alpheratz	357 36.7	N29 12.9
	14	45 35.1	352 28.8	29.2	308 21.8	16.4	26 03.3	05.9	69 46.5	31.1		Altair	62 01.4	N 8 55.6
	15	60 37.6	7 28.3	30.1	323 22.8	16.4	41 05.2	06.1	84 48.7	31.0		Ankaa	353 09.0	S42 10.9
	16	75 40.1	22 27.7	30.9	338 23.9	16.3	56 07.1	06.3	99 50.9	30.9		Antares	112 17.4	S26 29.0
	17	90 42.5	37 27.2	31.7	353 24.9	16.2	71 09.0	06.5	114 53.2	30.9				
	18	105 45.0	52 26.7	N20 32.6	8 26.0	N25 16.1	86 10.9	N 7 06.8	129 55.4	S11 30.8		Arcturus	145 48.9	N19 03.6
	19	120 47.5	67 26.1	33.4	23 27.0	16.0	101 12.8	07.0	144 57.6	30.7		Atria	107 12.7	S69 03.9
	20	135 49.9	82 25.6	34.2	38 28.1	15.9	116 14.7	07.2	159 59.9	30.6		Avior	234 15.2	S59 35.3
	21	150 52.4	97 25.0	35.0	53 29.1	15.8	131 16.6	07.4	175 02.1	30.5		Bellatrix	278 24.6	N 6 22.2
	22	165 54.9	112 24.5	35.9	68 30.2	15.7	146 18.5	07.7	190 04.3	30.4		Betelgeuse	270 53.8	N 7 24.6
	23	180 57.3	127 23.9	36.7	83 31.2	15.6	161 20.4	07.9	205 06.5	30.4				
S A T U R D A Y	8 00	195 59.8	142 23.4	N20 37.5	98 32.3	N25 15.5	176 22.3	N 7 08.1	220 08.8	S11 30.3		Canopus	263 53.2	S52 42.7
	01	211 02.2	157 22.9	38.3	113 33.3	15.4	191 24.2	08.4	235 11.0	30.2		Capella	280 24.3	N46 01.4
	02	226 04.7	172 22.3	39.2	128 34.4	15.3	206 26.1	08.6	250 13.2	30.1		Deneb	49 27.0	N45 21.4
	03	241 07.2	187 21.8	40.0	143 35.4	15.3	221 28.0	08.8	265 15.5	30.0		Denebola	182 26.2	N14 26.5
	04	256 09.6	202 21.2	40.8	158 36.5	15.2	236 29.9	09.0	280 17.7	29.9		Diphda	348 49.1	S17 51.7
	05	271 12.1	217 20.7	41.6	173 37.5	15.1	251 31.8	09.3	295 19.9	29.9				
	06	286 14.6	232 20.1	N20 42.5	188 38.6	N25 15.0	266 33.7	N 7 09.5	310 22.1	S11 29.8		Dubhe	193 42.2	N61 37.7
	07	301 17.0	247 19.6	43.3	203 39.6	14.9	281 35.6	09.7	325 24.4	29.7		Elnath	278 03.9	N28 37.6
	08	316 19.5	262 19.0	44.1	218 40.7	14.8	296 37.5	09.9	340 26.6	29.6		Eltanin	90 42.7	N51 28.8
	09	331 22.0	277 18.5	44.9	233 41.7	14.7	311 39.4	10.2	355 28.8	29.5		Enif	33 40.4	N 9 58.7
	10	346 24.4	292 17.9	45.7	248 42.7	14.6	326 41.3	10.4	10 31.1	29.5		Fomalhaut	15 16.4	S29 30.0
	11	1 26.9	307 17.4	46.5	263 43.8	14.5	341 43.2	10.6	25 33.3	29.4				
	12	16 29.4	322 16.8	N20 47.3	278 44.8	N25 14.4	356 45.1	N 7 10.8	40 35.5	S11 29.3		Gacrux	171 52.7	S57 14.7
	13	31 31.8	337 16.3	48.2	293 45.9	14.3	11 47.0	11.1	55 37.8	29.2		Gienah	175 44.8	S17 40.3
	14	46 34.3	352 15.8	49.0	308 46.9	14.2	26 48.9	11.3	70 40.0	29.1		Hadar	148 37.5	S60 29.1
	15	61 36.7	7 15.2	49.8	323 48.0	14.1	41 50.8	11.5	85 42.2	29.0		Hamal	327 53.2	N23 34.2
	16	76 39.2	22 14.7	50.6	338 49.0	14.0	56 52.7	11.8	100 44.5	29.0		Kaus Aust.	83 34.4	S34 22.4
	17	91 41.7	37 14.1	51.4	353 50.1	13.9	71 54.6	12.0	115 46.7	28.9				
	18	106 44.1	52 13.6	N20 52.2	8 51.1	N25 13.8	86 56.5	N 7 12.2	130 48.9	S11 28.8		Kochab	137 18.7	N74 03.4
	19	121 46.6	67 13.0	53.0	23 52.2	13.7	101 58.4	12.4	145 51.1	28.7		Markab	13 31.6	N15 19.6
	20	136 49.1	82 12.5	53.8	38 53.2	13.6	117 00.3	12.7	160 53.4	28.6		Menkar	314 08.0	N 4 10.7
	21	151 51.5	97 11.9	54.6	53 54.3	13.6	132 02.2	12.9	175 55.6	28.5		Menkent	147 59.0	S36 29.1
	22	166 54.0	112 11.4	55.4	68 55.3	13.5	147 04.1	13.1	190 57.8	28.5		Miaplacidus	221 38.2	S69 49.0
	23	181 56.5	127 10.8	56.2	83 56.3	13.4	162 06.0	13.3	206 00.1	28.4				
S U N D A Y	9 00	196 58.9	142 10.3	N20 57.0	98 57.4	N25 13.3	177 07.9	N 7 13.6	221 02.3	S11 28.3		Mirfak	308 30.8	N49 56.6
	01	212 01.4	157 09.7	57.8	113 58.4	13.2	192 09.8	13.8	236 04.5	28.2		Nunki	75 49.6	S26 16.1
	02	227 03.9	172 09.1	58.6	128 59.5	13.1	207 11.7	14.0	251 06.8	28.1		Peacock	53 08.2	S56 39.5
	03	242 06.3	187 08.6	20 59.4	144 00.5	13.0	222 13.6	14.3	266 09.0	28.1		Pollux	243 19.1	N27 58.3
	04	257 08.8	202 08.0	21 00.2	159 01.6	12.9	237 15.5	14.5	281 11.2	28.0		Procyon	244 52.4	N 5 09.9
	05	272 11.2	217 07.5	01.0	174 02.6	12.8	252 17.4	14.7	296 13.5	27.9				
	06	287 13.7	232 06.9	N21 01.8	189 03.7	N25 12.7	267 19.3	N 7 14.9	311 15.7	S11 27.8		Rasalhague	95 59.8	N12 32.4
	07	302 16.2	247 06.4	02.6	204 04.7	12.6	282 21.2	15.2	326 17.9	27.7		Regulus	207 35.8	N11 51.2
	08	317 18.6	262 05.8	03.4	219 05.7	12.5	297 23.1	15.4	341 20.2	27.6		Rigel	281 05.5	S 8 10.6
	09	332 21.1	277 05.3	04.2	234 06.8	12.4	312 25.0	15.6	356 22.4	27.6		Rigel Kent.	139 41.7	S60 55.8
	10	347 23.6	292 04.7	05.0	249 07.8	12.3	327 26.9	15.8	11 24.6	27.5		Sabik	102 04.3	S15 45.3
	11	2 26.0	307 04.2	05.8	264 08.9	12.2	342 28.8	16.1	26 26.9	27.4				
	12	17 28.5	322 03.6	N21 06.6	279 09.9	N25 12.1	357 30.7	N 7 16.3	41 29.1	S11 27.3		Schedar	349 33.3	N56 39.7
	13	32 31.0	337 03.1	07.4	294 11.0	12.0	12 32.6	16.5	56 31.3	27.2		Shaula	96 12.2	S37 07.2
	14	47 33.4	352 02.5	08.2	309 12.0	11.9	27 34.5	16.7	71 33.6	27.2		Sirius	258 27.6	S16 45.0
	15	62 35.9	7 01.9	09.0	324 13.0	11.8	42 36.4	17.0	86 35.8	27.1		Spica	158 23.5	S11 17.0
	16	77 38.3	22 01.4	09.8	339 14.1	11.7	57 38.3	17.2	101 38.0	27.0		Suhail	222 47.2	S43 31.8
	17	92 40.8	37 00.8	10.5	354 15.1	11.6	72 40.2	17.4	116 40.3	26.9				
	18	107 43.3	52 00.3	N21 11.3	9 16.2	N25 11.5	87 42.1	N 7 17.7	131 42.5	S11 26.8		Vega	80 34.1	N38 48.0
	19	122 45.7	66 59.7	12.1	24 17.2	11.4	102 44.0	17.9	146 44.7	26.8		Zuben'ubi	136 57.4	S16 08.4
	20	137 48.2	81 59.2	12.9	39 18.3	11.3	117 45.9	18.1	161 47.0	26.7				
	21	152 50.7	96 58.6	13.7	54 19.3	11.2	132 47.8	18.3	176 49.2	26.6				
	22	167 53.1	111 58.0	14.5	69 20.3	11.1	147 49.7	18.6	191 51.4	26.5				
	23	182 55.6	126 57.5	15.3	84 21.4	11.0	162 51.6	18.8	206 53.7	26.4				
h m														
Mer. Pass. 10 54.2														
v -0.5 d 0.8														
v 1.0 d, 0.1														
v 1.9 d 0.2														
v 2.2 d 0.1														
SHA Mer. Pass														
Venus 306 23.6 14 31														
Mars 262 32.5 17 25														
Jupiter 340 22.5 12 13														
Saturn 24 09.0 9 18														

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise																				
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	7	8	9	10																
	°	'		°	'																												
F R I D A Y	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m													
	7	00	179	25.1	N	6	38.8	350	10.6	13.9	S	9	34.9	14.4	56.5	N	70	01	13	03	20	04	31	22	29	24	40	00	40	25	44	01	44
	01	194	25.3			39.8	4	43.5	14.0			9	49.3	14.4	56.5	68	02	02	03	38	04	41	22	04	24	40	00	40					
	02	209	25.5			40.7	19	16.5	13.8			10	03.7	14.3	56.5	66	02	32	03	52	04	48	21	45	23	55							
	03	224	25.7			41.7	33	49.3	13.8			10	18.0	14.3	56.5	64	02	54	04	03	04	55	21	29	23	25	25	44			01	44	
	04	239	25.8			42.6	48	22.1	13.7			10	32.3	14.2	56.6	62	03	11	04	13	05	00	21	17	23	03	25	00			01	00	
	05	254	26.0			43.5	62	54.8	13.7			10	46.5	14.2	56.6	60	03	25	04	21	05	05	21	06	22	46	24	31			00	31	
	06	269	26.2	N	6	44.5	77	27.5	13.5	S11	00.7	14.2	56.6	N	58	03	36	04	28	05	09	20	57	22	31	24	09			00	09		
	07	284	26.4			45.4	92	00.0	13.5			11	14.9	14.1	56.6	56	03	46	04	34	05	13	20	48	22	18	23	51			25	19	
	08	299	26.6			46.4	106	32.5	13.5			11	29.0	14.1	56.7	54	03	55	04	40	05	17	20	41	22	07	23	35			25	00	
	09	314	26.7			47.3	121	05.0	13.3			11	43.1	14.1	56.7	52	04	02	04	45	05	20	20	35	21	58	23	22			24	44	
	10	329	26.9			48.2	135	37.3	13.3			11	57.2	14.0	56.7	50	04	09	04	49	05	23	20	29	21	49	23	11			24	30	
	11	344	27.1			49.2	150	09.6	13.2			12	11.2	13.9	56.7	45	04	22	04	58	05	29	20	17	21	31	22	47			24	02	
	12	359	27.3	N	6	50.1	164	41.8	13.2	S12	25.1	13.9	56.7	N	40	04	33	05	06	05	34	20	06	21	16	22	28			23	39		
	13	14	27.4			51.1	179	14.0	13.0			12	39.0	13.9	56.8	35	04	42	05	12	05	38	19	58	21	04	22	12			23	21	
	14	29	27.6			52.0	193	46.0	13.0			12	52.9	13.8	56.8	30	04	49	05	17	05	42	19	50	20	53	21	59			23	05	
	15	44	27.8			52.9	208	18.0	12.9			13	06.7	13.8	56.8	20	05	00	05	26	05	48	19	37	20	35	21	36			22	39	
	16	59	28.0			53.9	222	49.9	12.9			13	20.5	13.7	56.8	N	10	05	08	05	32	05	54	19	26	20	19	21	16			22	16
	17	74	28.1			54.8	237	21.8	12.7			13	34.2	13.7	56.8	0	05	14	05	38	05	59	19	15	20	04	20	57			21	55	
	18	89	28.3	N	6	55.8	251	53.5	12.7	S13	47.9	13.6	56.9	S	10	05	18	05	42	06	04	19	05	19	50	20	39			27	33		
	19	104	28.5			56.7	266	25.2	12.6			14	01.5	13.6	56.9	20	05	21	05	47	06	09	18	54	19	34	20	19			21	11	
	20	119	28.7			57.6	280	56.8	12.5			14	15.1	13.5	56.9	30	05	23	05	51	06	15	18	41	19	16	19	57			20	45	
	21	134	28.8			58.6	295	28.3	12.4			14	28.6	13.4	56.9	35	05	23	05	53	06	18	18	34	19	06	19	44			20	30	
	22	149	29.0			59.5	309	59.7	12.3			14	42.0	13.4	57.0	40	05	23	05	54	06	22	18	26	18	54	19	29			20	12	
	23	164	29.2			00.4	324	31.0	12.2			14	55.4	13.3	57.0	45	05	22	05	56	06	26	18	17	18	41	19	11			19	51	
S A T U R D A Y	8	00	179	29.4	N	7	01.4	339	02.2	12.2	S15	08.7	13.3	57.0	S	50	05	21	05	59	06	31	18	05	18	24	18	49			19	24	
	01	194	29.5		02.3	353	33.4	12.1			15	22.0	13.1	57.0	52	05	20	05	59	06	33	18	00	18	16	18	39			19	11		
	02	209	29.7		03.3	8	04.5	12.0			15	35.1	13.2	57.0	54	05	19	06	00	06	36	17	54	18	08	18	27			18	56		
	03	224	29.9		04.2	22	35.5	11.8			15	48.3	13.0	57.1	56	05	18	06	01	06	39	17	48	17	58	18	14			18	39		
	04	239	30.1		05.1	37	06.3	11.8			16	01.3	13.0	57.1	58	05	17	06	02	06	42	17	41	17	47	17	58			18	18		
	05	254	30.2		06.1	51	37.1	11.8			16	14.3	13.0	57.1	S	60	05	15	06	03	06	45	17	33	17	35	17	40			17	52	
	06	269	30.4	N	7	07.0	66	07.9	11.6	S16	27.3	12.8	57.1		Lat.	Sunset	Twilight		Moonset														
	07	284	30.6		07.9	80	38.5	11.5	16	40.1	12.8	57.1																					
	08	299	30.8			08.9	95	09.0	11.4			16	52.9	12.7	57.2																		
	09	314	30.9			09.8	109	39.4	11.4			17	05.6	12.6	57.2																		
	10	329	31.1			10.7	124	09.8	11.2			17	18.2	12.6	57.2																		
	11	344	31.3			11.7	138	40.0	11.2			17	30.8	12.5	57.2																		
	12	359	31.4	N	7	12.6	153	10.2	11.0	S17	43.3	12.3	57.2	N	70	19	35	20	48	23	05	04	41	04	01								
	13	14	31.6			13.5	167	40.2	11.0			17	55.6	12.4	57.3	68	19	26	20	29	22	08	04	55	04	28	03	35					
	14	29	31.8			14.5	182	10.2	10.9			18	08.0	12.2	57.3	66	19	18	20	15	21	36	05	06	04	49	04	22					
	15	44	32.0			15.4	196	40.1	10.7			18	20.2	12.1	57.3	64	19	11	20	03	21	14	05	15	05	05	04	52			04	26	
	16	59	32.1			16.4	211	09.8	10.7			18	32.3	12.1	57.3	62	19	05	19	53	20	56	05	23	05	19	05	15			05	11	
	17	74	32.3			17.3	225	39.5	10.6			18	44.4	12.0	57.3	60	19	00	19	45	20	42	05	30	05	31	05	34			05	40	
	18	89	32.5	N	7	18.2	240	09.1	10.4	S18	56.4	11.8	57.4	N	58	18	56	19	37	20	30	05	37	05	41	05	49			06	03		
	19	104	32.7			19.2	254	38.5	10.4			19	08.2	11.8	57.4	56	18	52	19	31	20	20	05	42	05	50	06	03			06	22	
	20	119	32.8			20.1	269	07.9	10.3			19	20.0	11.7	57.4	54	18	48	19	25	20	11	05	47	05	59	06	14			06	37	
	21	134	33.0			21.0	283	37.2	10.2			19	31.7	11.6	57.4	52	18	45	19	20	20	03	05	52	06	06	06	24			06	51	
	22	149	33.2			22.0	298	06.4	10.0			19	43.3	11.5	57.4	50	18	42	19	16	19	56	05	56	06	12	06	34			07	03	
	23	164	33.3			22.9	312	35.4	10.0			19	54.8	11.5	57.5	45	18	36	19	06	19	42	06	05	06	26	06	53			07	27	
	S U N D A Y	9	00	179	33.5	N	7	23.8	327	04.4	9.9	S20	06.3	11.3	57.5	N	40	18	31	18	59	19	32	06	12	06	38	07	09			07	47
01		194	33.7		24.7	341	33.3	9																									

UT	ARIES		VENUS -4.0		MARS +1.1		JUPITER -2.0		SATURN +0.9		STARS											
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA	Dec											
MONDAY	10 00	197 58.1	141 56.9 N21	16.0	99 22.4 N25	10.9	177 53.5 N	7 19.0	221 55.9 S11	26.3	Acamar	315 13.3 S40 12.9										
	01	213 00.5	156 56.4	16.8	114 23.5	10.8	192 55.4	19.2	236 58.1	26.3	Achernar	335 21.9 S57 07.2										
	02	228 03.0	171 55.8	17.6	129 24.5	10.7	207 57.3	19.5	252 00.4	26.2	Acruz	173 01.0 S63 13.8										
	03	243 05.5	186 55.2	18.4	144 25.5	10.6	222 59.2	19.7	267 02.6	26.1	Adhara	255 07.1 S29 00.4										
	04	258 07.9	201 54.7	19.1	159 26.6	10.4	238 01.1	19.9	282 04.8	26.0	Aldebaran	290 41.5 N16 33.3										
	05	273 10.4	216 54.1	19.9	174 27.6	10.3	253 03.0	20.1	297 07.1	25.9												
	06	288 12.8	231 53.6 N21	20.7	189 28.7 N25	10.2	268 04.9 N	7 20.4	312 09.3 S11	25.9	Alioth	166 13.7 N55 50.0										
	07	303 15.3	246 53.0	21.5	204 29.7	10.1	283 06.8	20.6	327 11.5	25.8	Alkaid	152 52.7 N49 11.8										
	08	318 17.8	261 52.4	22.2	219 30.7	10.0	298 08.7	20.8	342 13.8	25.7	Alnair	27 35.0 S46 50.0										
	09	333 20.2	276 51.9	23.0	234 31.8	9.9	313 10.6	21.0	357 16.0	25.6	Anilam	275 39.4 S 1 11.1										
	10	348 22.7	291 51.3	23.8	249 32.8	9.8	328 12.5	21.3	12 18.2	25.5	Alphard	217 49.0 S 8 45.7										
	11	3 25.2	306 50.7	24.6	264 33.9	9.7	343 14.4	21.5	27 20.5	25.5												
	12	18 27.6	321 50.2 N21	25.3	279 34.9 N25	9.6	358 16.3 N	7 21.7	42 22.7 S11	25.4	Alphecca	126 04.7 N26 38.0										
	13	33 30.1	336 49.6	26.1	294 35.9	9.5	13 18.2	22.0	57 24.9	25.3	Alpheratz	357 36.6 N29 12.9										
	14	48 32.6	351 49.1	26.9	309 37.0	9.4	28 20.1	22.2	72 27.2	25.2	Altair	62 01.4 N 8 55.6										
	15	63 35.0	6 48.5	27.6	324 38.0	9.3	43 22.0	22.4	87 29.4	25.1	Ankaa	353 09.0 S42 10.9										
	16	78 37.5	21 47.9	28.4	339 39.0	9.2	58 23.9	22.6	102 31.7	25.1	Antares	112 17.4 S26 29.0										
	17	93 40.0	36 47.4	29.2	354 40.1	9.1	73 25.8	22.9	117 33.9	25.0												
	18	108 42.4	51 46.8 N21	29.9	9 41.1 N25	9.0	88 27.7 N	7 23.1	132 36.1 S11	24.9	Arcturus	145 48.9 N19 03.6										
	19	123 44.9	66 46.2	30.7	24 42.2	8.9	103 29.6	23.3	147 38.4	24.8	Atria	107 12.6 S69 03.9										
	20	138 47.3	81 45.7	31.4	39 43.2	8.8	118 31.5	23.5	162 40.6	24.7	Avior	234 15.2 S59 35.3										
	21	153 49.8	96 45.1	32.2	54 44.2	8.7	133 33.4	23.8	177 42.8	24.6	Bellatrix	278 24.6 N 6 22.2										
	22	168 52.3	111 44.5	33.0	69 45.3	8.5	148 35.3	24.0	192 45.1	24.6	Betelgeuse	270 53.8 N 7 24.6										
23	183 54.7	126 44.0	33.7	84 46.3	8.4	163 37.2	24.2	207 47.3	24.5													
TUESDAY	11 00	198 57.2	141 43.4 N21	34.5	99 47.3 N25	08.3	178 39.1 N	7 24.4	222 49.5 S11	24.4	Canopus	263 53.2 S52 42.7										
	01	213 59.7	156 42.8	35.2	114 48.4	08.2	193 41.0	24.7	237 51.8	24.3	Capella	280 24.3 N46 01.4										
	02	229 02.1	171 42.3	36.0	129 49.4	08.1	208 42.9	24.9	252 54.0	24.2	Deneb	49 26.9 N45 21.4										
	03	244 04.6	186 41.7	36.8	144 50.4	08.0	223 44.8	25.1	267 56.2	24.2	Denebola	182 26.2 N14 26.5										
	04	259 07.1	201 41.1	37.5	159 51.5	07.9	238 46.7	25.3	282 58.5	24.1	Diphda	348 49.1 S17 51.7										
	05	274 09.5	216 40.6	38.3	174 52.5	07.8	253 48.6	25.6	298 00.7	24.0												
	06	289 12.0	231 40.0 N21	39.0	189 53.6 N25	07.7	268 50.5 N	7 25.8	313 03.0 S11	23.9	Dubhe	193 42.3 N61 37.7										
	07	304 14.5	246 39.4	39.8	204 54.6	07.6	283 52.4	26.0	328 05.2	23.8	Elnath	278 03.9 N28 37.6										
	08	319 16.9	261 38.8	40.5	219 55.6	07.5	298 54.3	26.2	343 07.4	23.8	Eltanin	90 42.7 N51 28.8										
	09	334 19.4	276 38.3	41.3	234 56.7	07.4	313 56.2	26.5	358 09.7	23.7	Enif	33 40.4 N 9 58.7										
	10	349 21.8	291 37.7	42.0	249 57.7	07.2	328 58.1	26.7	13 11.9	23.6	Fomalhaut	15 16.4 S29 30.0										
	11	4 24.3	306 37.1	42.8	264 58.7	07.1	344 00.0	26.9	28 14.1	23.5												
	12	19 26.8	321 36.6 N21	43.5	279 59.8 N25	07.0	359 01.9 N	7 27.1	43 16.4 S11	23.4	Gacrux	171 52.7 S57 14.7										
	13	34 29.2	336 36.0	44.3	295 00.8	06.9	14 03.8	27.4	58 18.6	23.4	Gienah	175 44.8 S17 40.4										
	14	49 31.7	351 35.4	45.0	310 01.8	06.8	29 05.7	27.6	73 20.9	23.3	Hadar	148 37.5 S60 29.1										
	15	64 34.2	6 34.9	45.7	325 02.9	06.7	44 07.6	27.8	88 23.1	23.2	Hamal	327 53.2 N23 34.2										
	16	79 36.6	21 34.3	46.5	340 03.9	06.6	59 09.5	28.1	103 25.3	23.1	Kaus Aust.	83 34.4 S34 22.4										
	17	94 39.1	36 33.7	47.2	355 04.9	06.5	74 11.4	28.3	118 27.6	23.0												
	18	109 41.6	51 33.1 N21	48.0	10 06.0 N25	06.4	89 13.3 N	7 28.5	133 29.8 S11	23.0	Kochab	137 18.7 N74 03.4										
	19	124 44.0	66 32.6	48.7	25 07.0	06.2	104 15.2	28.7	148 32.0	22.9	Markab	13 01.6 N15 19.6										
	20	139 46.5	81 32.0	49.5	40 08.0	06.1	119 17.1	29.0	163 34.3	22.8	Menkar	314 08.0 N 4 10.7										
	21	154 49.0	96 31.4	50.2	55 09.1	06.0	134 19.0	29.2	178 36.5	22.7	Menkent	147 59.0 S36 29.1										
	22	169 51.4	111 30.8	50.9	70 10.1	05.9	149 20.9	29.4	193 38.8	22.6	Miaplacidus	221 38.2 S69 49.0										
23	184 53.9	126 30.3	51.7	85 11.1	05.8	164 22.8	29.6	208 41.0	22.6													
WEDNESDAY	12 00	199 56.3	141 29.7 N21	52.4	100 12.2 N25	05.7	179 24.7 N	7 29.9	223 43.2 S11	22.5	Mirfak	308 30.8 N49 56.1										
	01	214 58.8	156 29.1	53.1	115 13.2	05.6	194 26.6	30.1	238 45.5	22.4	Nunki	75 49.5 S26 16.1										
	02	230 01.3	171 28.5	53.9	130 14.2	05.5	209 28.5	30.3	253 47.7	22.3	Peacock	53 08.2 S56 39.5										
	03	245 03.7	186 28.0	54.6	145 15.3	05.3	224 30.4	30.5	268 50.0	22.3	Pollux	243 19.1 N27 58.3										
	04	260 06.2	201 27.4	55.3	160 16.3	05.2	239 32.3	30.8	283 52.2	22.2	Procyon	244 52.4 N 5 09.9										
	05	275 08.7	216 26.8	56.1	175 17.3	05.1	254 34.2	31.0	298 54.4	22.1												
	06	290 11.1	231 26.2 N21	56.8	190 18.4 N25	05.0	269 36.1 N	7 31.2	313 56.7 S11	22.0	Rasalhague	95 59.8 N12 32.4										
	07	305 13.6	246 25.7	57.5	205 19.4	04.9	284 38.0	31.4	328 58.9	21.9	Regulus	207 35.8 N11 51.2										
	08	320 16.1	261 25.1	58.2	220 20.4	04.8	299 39.9	31.7	344 01.2	21.9	Rigel	281 05.5 S 8 10.6										
	09	335 18.5	276 24.5	59.0	235 21.5	04.7	314 41.8	31.9	359 03.4	21.8	Rigel Kent.	139 41.7 S60 55.8										
	10	350 21.0	291 23.9	21 59.7	250 22.5	04.5	329 43.7	32.1	14 05.6	21.7	Sabik	102 04.3 S15 45.3										
	11	5 23.4	306 23.4	22 00.4	265 23.5	04.4	344 45.6	32.3	29 07.9	21.6												
	12	20 25.9	321 22.8 N22	01.1	280 24.6 N25	04.3	359 47.5 N	7 32.6	44 10.1 S11	21.5	Schedar	349 33.3 N56 39.7										
	13	35 28.4	336 22.2	01.9	295 25.6	04.2	14 49.4	32.8	59 12.3	21.5	Shaula	96 12.2 S37 07.2										
	14	50 30.8	351 21.6	02.6	310 26.6	04.1	29 51.3	33.0	74 14.6	21.4	Sirius	258 27.6 S16 45.0										
	15	65 33.3	6 21.0	03.3	325 27.6	04.0	44 53.2	33.2	89 16.8	21.3	Spica	158 23.5 S11 17.0										
	16	80 35.8	21 20.5	04.0	340 28.7	03.8	59 55.1	33.5	104 19.1	21.2	Suhail	222 47.2 S43 31.8										
	17	95 38.2	36 19.9	04.8	355 29.7	03.7	74 57.0	33.7	119 21.3	21.1												
	18	110 40.7	51 19.3 N22	05.5	10 30.7 N25	03.6	89 58.9 N	7 33.9	134 23.5 S11	21.1	Vega	80 34.1 N38 48.0										
	19	125 43.2	66 18.7	06.2	25 31.8	03.5	105 00.8	34.1	149 25.8	21.0	Zuben'ubi	136 57.3 S16 08.4										
	20	140 45.6	81 18.1	06.9	40 32.8	03.4	120 02.7	34.4	164 28.0	20.9												
	21	155 48.1	96 17.6	07.6	55 33.8	03.3	135 04.6	34.6	179 30.3	20.8												
	22	170 50.6	111 17.0	08.3	70 34.9	03.1	150 06.5	34.8	194 32.5	20.8												
23	185 53.0	126 16.4	09.0	85 35.9	03.0	165 08.4	35.0	209 34.8	20.7													
h m Mer.Pass. 10 42.4												v -0.6 d 0.7		v 1.0 d 0.1		v 1.9 d 0.2		v 2.2 d 0.1		SHA Mer.Pass.		
h m Venus 302 46.2 14 34												h m Mars 260 50.1 17 20		h m Jupiter 339 41.9 12 04		h m Saturn 23 52.3 9 07						

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	10	11	12	13			
d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m		
MONDAY	179	37.6	N 7	46.1	314	08.7	7.4	S24	07.0	8.4	57.9	N 70	////	02 35	04 04					
	01	194	37.8	47.1	328	35.1	7.3	24	15.4	8.4	58.0	68	01 36	03 02	04 17					
	02	209	38.0	48.0	343	01.4	7.2	24	23.8	8.2	58.0	66	02 13	03 39	04 37					
	03	224	38.1	48.9	357	27.6	7.1	24	32.0	8.0	58.0	64	02 38	03 51	04 44					
	04	239	38.3	49.8	11	53.7	7.0	24	40.0	8.0	58.0	62	02 58	04 02	04 51	01 00	03 07		05 04	
	05	254	38.5	50.8	26	19.7	7.0	24	48.0	7.7	58.0	60	03 13	04 11	04 56	00 31	02 15	03 37	04 17	
	06	269	38.6	N 7	51.7	40	45.7	6.8	S24	55.7	7.7	58.0	N 58	03 26	04 19	05 01	00 09	01 43	02 59	03 46
	07	284	38.8	52.6	55	11.5	6.7	25	03.4	7.4	58.1	56	03 37	04 26	05 06	25 19	01 19	02 33	03 23	
	08	299	39.0	53.5	69	37.2	6.6	25	10.8	7.4	58.1	54	03 46	04 32	05 09	25 00	01 00	02 12	03 04	
	09	314	39.1	54.5	84	02.8	6.5	25	18.2	7.2	58.1	52	03 54	04 38	05 13	24 44	00 44	01 54	02 48	
	10	329	39.3	55.4	98	28.3	6.5	25	25.4	7.0	58.1	50	04 02	04 43	05 16	24 30	00 30	01 39	02 34	
	11	344	39.5	56.3	112	53.8	6.3	25	32.4	6.9	58.1	45	04 16	04 53	05 23	24 02	00 02	01 09	02 06	
	12	359	39.6	N 7	57.2	127	19.1	6.3	S25	39.3	6.7	58.2	N 40	04 28	05 01	05 29	23 39	24 46	00 46	01 44
	13	14	39.8	58.2	141	44.4	6.2	25	46.0	6.6	58.2	35	04 37	05 08	05 34	23 21	24 26	00 26	01 25	
	14	29	40.0	7 59.1	156	09.6	6.0	25	52.6	6.4	58.2	30	04 45	05 14	05 38	23 05	24 10	00 10	01 09	
	15	44	40.1	8 00.0	170	34.6	6.0	25	59.0	6.3	58.2	20	04 57	05 23	05 46	22 39	23 42	24 42	00 42	
	16	59	40.3	00.9	184	59.6	5.9	26	05.3	6.1	58.2	N 10	05 06	05 31	05 52	22 16	23 18	24 19	00 19	
	17	74	40.5	01.9	199	24.5	5.9	26	11.4	6.0	58.2	0	05 13	05 37	05 58	21 55	22 55	23 57	24 57	
	18	89	40.6	N 8	02.8	213	49.4	5.7	S26	17.4	5.7	58.3	S 10	05 18	05 42	06 04	21 33	22 33	23 35	24 38
	19	104	40.8	03.7	228	14.1	5.7	26	23.1	5.7	58.3	20	05 22	05 47	06 10	21 11	22 09	23 12	24 17	
	20	119	41.0	04.6	242	38.8	5.5	26	28.8	5.4	58.3	30	05 25	05 52	06 16	20 45	21 41	22 45	23 53	
	21	134	41.1	05.5	257	03.3	5.5	26	34.2	5.3	58.3	35	05 25	05 55	06 20	20 30	21 25	22 28	23 39	
	22	149	41.3	06.5	271	27.8	5.5	26	39.5	5.2	58.3	40	05 26	05 57	06 25	20 12	21 05	22 10	23 22	
23	164	41.5	07.4	285	52.3	5.3	26	44.7	4.9	58.3	45	05 26	06 00	06 30	19 51	20 42	21 47	23 02		
TUESDAY	00	179	41.6	N 8	08.3	300	16.6	5.3	S26	49.6	4.8	58.4	S 50	05 26	06 03	06 36	19 24	20 13	21 18	22 37
	01	194	41.8	09.2	314	40.9	5.2	26	54.4	4.7	58.4	52	05 25	06 04	06 38	19 11	19 58	21 04	22 25	
	02	209	42.0	10.2	329	05.1	5.1	26	59.1	4.4	58.4	54	05 25	06 06	06 41	18 56	19 41	20 47	22 11	
	03	224	42.1	11.1	343	29.2	5.1	27	03.5	4.3	58.4	56	05 24	06 07	06 45	18 39	19 21	20 28	21 55	
	04	239	42.3	12.0	357	53.3	5.0	27	07.8	4.1	58.4	58	05 23	06 09	06 48	18 18	18 56	20 03	21 35	
	05	254	42.5	12.9	12	17.3	4.9	27	11.9	3.9	58.4	S 60	05 22	06 10	06 52	17 52	18 22	19 30	21 11	
	06	269	42.6	N 8	13.8	26	41.2	4.9	S27	15.8	3.8	58.5	Lat.	Sunset	Twilight		Moonset			
	07	284	42.8	14.8	41	05.1	4.8	27	19.6	3.6	58.5	Civil			Naut.	10	11	12	13	
	08	299	43.0	15.7	55	28.9	4.7	27	23.2	3.4	58.5	N 72	20 02	21 34	////					
	09	314	43.1	16.6	69	52.6	4.7	27	26.6	3.3	58.5		N 70	19 48	21 04	////				
	10	329	43.3	17.5	84	16.3	4.7	27	29.9	3.0	58.5	68	19 37	20 43	22 35					
	11	344	43.5	18.4	98	40.0	4.5	27	32.9	2.9	58.5	66	19 28	20 27	21 54					
	12	359	43.6	N 8	19.3	113	03.5	4.6	S27	35.8	2.7	58.6	64	19 20	20 13	21 28	04 26			
	13	14	43.8	20.3	127	27.1	4.4	27	38.5	2.5	58.6	62	19 13	20 02	21 08	05 11	05 05		07 26	
	14	29	44.0	21.2	141	50.5	4.5	27	41.0	2.4	58.6	60	19 08	19 53	20 52	05 40	05 58	06 44	08 12	
	15	44	44.1	22.1	156	14.0	4.4	27	43.4	2.1	58.6	N 58	19 02	19 45	20 39	06 03	06 30	07 21	08 43	
	16	59	44.3	23.0	170	37.4	4.3	27	45.5	2.0	58.6	56	18 58	19 38	20 27	06 22	06 54	07 47	09 06	
	17	74	44.5	23.9	185	00.7	4.3	27	47.5	1.8	58.6	54	18 54	19 31	20 18	06 37	07 13	08 08	09 24	
	18	89	44.6	N 8	24.9	199	24.0	4.3	S27	49.3	1.6	58.5	52	18 50	19 26	20 09	06 51	07 30	08 26	09 40
	19	104	44.8	25.8	213	47.3	4.2	27	50.9	1.4	58.7	50	18 47	19 21	20 02	07 03	07 44	08 41	09 54	
	20	119	44.9	26.7	228	10.5	4.2	27	52.3	1.3	58.7	45	18 40	19 10	19 47	07 27	08 13	09 11	10 21	
	21	134	45.1	27.6	242	33.7	4.1	27	53.6	1.0	58.7	N 40	18 34	19 02	19 35	07 47	08 35	09 34	10 43	
	22	149	45.3	28.5	256	56.8	4.2	27	54.6	0.9	58.7	35	18 29	18 55	19 26	08 04	08 54	09 54	11 01	
23	164	45.4	29.4	271	20.0	4.1	27	55.5	0.7	58.7	30	18 25	18 49	19 18	08 18	09 10	10 10	11 17		
WEDNESDAY	00	179	45.6	N 8	30.4	285	43.1	4.0	S27	56.2	0.5	58.7	20	18 17	18 39	19 05	08 43	09 38	10 38	11 43
	01	194	45.8	31.3	300	06.1	4.1	27	56.7	0.3	58.8	N 10	18 10	18 32	18 56	09 04	10 01	11 02	12 05	
	02	209	45.9	32.2	314	29.2	4.0	27	57.0	0.1	58.8	0	18 04	18 25	18 50	09 24	10 23	11 25	12 26	
	03	224	46.1	33.1	328	52.2	4.0	27	57.1	0.0	58.8	S 10	17 58	18 20	18 44	09 44	10 45	11 47	12 47	
	04	239	46.2	34.0	343	15.2	4.0	27	57.1	0.3	58.8	20	17 52	18 14	18 40	10 06	11 09	12 11	13 09	
	05	254	46.4	34.9	357	38.2	4.0	27	56.8	0.4	58.8	30	17 45	18 09	18 37	10 30	11 36	12 38	13 34	
	06	269	46.6	N 8	35.8	12	01.2	4.0	S27	56.4	0.6	58.8	35	17 41	18 07	18 36	10 45	11 52	12 55	13 49
	07	284	46.7	36.8	26	24.2	4.0	27	55.8	0.9	58.8	40	17 37	18 04	18 36	11 02	12 11	13 14	14 07	
	08	299	46.9	37.7	40	47.2	3.9	27	54.9	1.0	58.9	45	17 32	18 01	18 35	11 23	12 34	13 37	14 27	
	09	314	47.1	38.6	55	10.1	4.0	27	53.9	1.2	58.9	S 50	17 26	17 58	18 36	11 49	13 04	14 06	15 06	
	10	329	47.2	39.5	69	33.1	3.9	27	52.7	1.3	58.9	52	17 23	17 57	18 36	12 01	13 18	14 20	15 20	
	11	344	47.4	40.4	83	56.0	4.0	27	51.4	1.6	58.9	54	17 20	17 56	18 36	12 16	13 35	14 37	15 20	
	12	359	47.5	N 8	41.3	98	19.0	3.9	S27	49.8	1.8	58.9	56	17 17	17 54	18 37	12 33	13 55	14 57	15 37
	13	14	47.7	42.2	112	41.9	4.0	27	48.0	1.9	58.9	58	17 13	17 52	18 38	12 53	14 20	15 22	16 07	
	14	29	47.9	43.2	127	04.9	4.0	27	46.1	2.1	58.9	S 60	17 09	17 51	18 39	13 19	14 54	15 55	16 21	
	15	44	48.0	44.1	141	27.9	3.9	27	44.0	2.3	58.9									

UT		ARIES		VENUS −4.1		MARS +1.1		JUPITER −2.0		SATURN +0.9		STARS		
d h		GHA		GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
		° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
13	00	200 55.5		141 15.8 N22	09.8	100 36.9 N25	02.9	180 10.3 N 7	35.3	224 37.0 S11	20.6	Acamar	315 13.3 S40	12.9
	01	215 57.9		156 15.2	10.5	115 37.9	02.8	195 12.2	35.5	239 39.2	20.5	Achernar	335 21.8 S57	07.2
	02	231 00.4		171 14.7	11.2	130 39.0	02.7	210 14.1	35.7	254 41.5	20.4	AcruX	173 01.0 S63	13.8
	03	246 02.9		186 14.1	11.9	145 40.0	02.5	225 16.0	35.9	269 43.7	20.4	Adhara	255 07.1 S29	00.4
	04	261 05.3		201 13.5	12.6	160 41.0	02.4	240 17.9	36.2	284 46.0	20.3	Aldebaran	290 41.5 N16	33.3
	05	276 07.8		216 12.9	13.3	175 42.1	02.3	255 19.8	36.4	299 48.2	20.2			
	06	291 10.3		231 12.3 N22	14.0	190 43.1 N25	02.2	270 21.7 N 7	36.6	314 50.4 S11	20.1	Alioth	166 13.7 N55	50.0
	07	306 12.7		246 11.7	14.7	205 44.1	02.1	285 23.6	36.8	329 52.7	20.0	Alkaid	152 52.7 N49	11.8
	08	321 15.2		261 11.2	15.4	220 45.1	01.9	300 25.5	37.1	344 54.9	20.0	Alnair	27 35.0 S46	50.9
	09	336 17.7		276 10.6	16.1	235 46.2	01.8	315 27.4	37.3	359 57.2	19.9	Alnilam	275 39.4 S 1	11.3
	10	351 20.1		291 10.0	16.8	250 47.2	01.7	330 29.3	37.5	14 59.4	19.8	Alphard	217 49.0 S 8	45.7
	11	6 22.6		306 09.4	17.5	265 48.2	01.6	345 31.2	37.7	30 01.6	19.7			
	12	21 25.1		321 08.8 N22	18.2	280 49.2 N25	01.5	0 33.1 N 7	38.0	45 03.9 S11	19.7	Alphecca	126 04.7 N26	38.0
	13	36 27.5		336 08.2	18.9	295 50.3	01.3	15 35.0	38.2	60 06.1	19.6	Alpheratz	357 36.6 N29	12.9
	14	51 30.0		351 07.7	19.6	310 51.3	01.2	30 36.9	38.4	75 08.4	19.5	Altair	62 01.4 N 8	55.6
	15	66 32.4		6 07.1	20.3	325 52.3	01.1	45 38.8	38.6	90 10.6	19.4	Ankaa	353 09.0 S42	10.8
	16	81 34.9		21 06.5	21.0	340 53.3	01.0	60 40.7	38.9	105 12.9	19.3	Antares	112 17.4 S26	29.0
	17	96 37.4		36 05.9	21.7	355 54.4	00.9	75 42.6	39.1	120 15.1	19.3			
	18	111 39.8		51 05.3 N22	22.4	10 55.4 N25	00.7	90 44.5 N 7	39.3	135 17.3 S11	19.2	Arcturus	145 48.9 N19	03.6
	19	126 42.3		66 04.7	23.1	25 56.4	00.6	105 46.4	39.5	150 19.6	19.1	Atria	107 12.6 S69	03.9
	20	141 44.8		81 04.1	23.8	40 57.5	00.5	120 48.3	39.8	165 21.8	19.0	Avior	234 15.2 S59	35.3
	21	156 47.2		96 03.5	24.5	55 58.5	00.4	135 50.2	40.0	180 24.1	19.0	Bellatrix	278 24.6 N 6	22.2
	22	171 49.7		111 03.0	25.2	70 59.5	00.2	150 52.1	40.2	195 26.3	18.9	Betelgeuse	270 53.8 N 7	24.6
	23	186 52.2		126 02.4	25.9	86 00.5	00.1	165 54.0	40.4	210 28.6	18.8			
14	00	201 54.6		141 01.8 N22	26.6	101 01.6 N25	00.0	180 55.9 N 7	40.7	225 30.8 S11	18.7	Canopus	263 53.2 S52	42.7
	01	216 57.1		156 01.2	27.2	116 02.6	24 59.9	195 57.8	40.9	240 33.0	18.6	Capella	280 24.3 N46	01.4
	02	231 59.6		171 00.6	27.9	131 03.6	59.7	210 59.7	41.1	255 35.3	18.6	Deneb	49 26.9 N45	21.4
	03	247 02.0		186 00.0	28.6	146 04.6	59.6	226 01.6	41.3	270 37.5	18.5	Denebola	182 26.1 N14	26.5
	04	262 04.5		200 59.4	29.3	161 05.7	59.5	241 03.5	41.6	285 39.8	18.4	Diphda	348 49.1 S17	51.7
	05	277 06.9		215 58.8	30.0	176 06.7	59.4	256 05.4	41.8	300 42.0	18.3			
	06	292 09.4		230 58.2 N22	30.7	191 07.7 N24	59.2	271 07.3 N 7	42.0	315 44.3 S11	18.3	Dubhe	193 42.3 N61	37.7
	07	307 11.9		245 57.7	31.3	206 08.7	59.1	286 09.2	42.2	330 46.5	18.2	Elnath	278 03.9 N28	37.6
	08	322 14.3		260 57.1	32.0	221 09.8	59.0	301 11.1	42.5	345 48.8	18.1	Eltanin	90 42.6 N51	28.8
	09	337 16.8		275 56.5	32.7	236 10.8	58.9	316 13.0	42.7	0 51.0	18.0	Enif	33 40.4 N 9	58.7
	10	352 19.3		290 55.9	33.4	251 11.8	58.7	331 14.9	42.9	15 53.2	17.9	Fomalhaut	15 16.4 S29	30.0
	11	7 21.7		305 55.3	34.1	266 12.8	58.6	346 16.8	43.1	30 55.5	17.9			
	12	22 24.2		320 54.7 N22	34.7	281 13.8 N24	58.5	1 18.7 N 7	43.4	45 57.7 S11	17.8	Gacrux	171 52.7 S57	14.7
	13	37 26.7		335 54.1	35.4	296 14.9	58.4	16 20.6	43.6	61 00.0	17.7	Gienah	175 44.8 S17	40.4
	14	52 29.1		350 53.5	36.1	311 15.9	58.2	31 22.5	43.8	76 02.2	17.6	Hadar	148 37.5 S60	29.1
	15	67 31.6		5 52.9	36.8	326 16.9	58.1	46 24.4	44.0	91 04.5	17.6	Hamal	327 53.2 N23	34.2
	16	82 34.1		20 52.3	37.4	341 17.9	58.0	61 26.3	44.3	106 06.7	17.5	Kaus Aust.	83 34.3 S34	22.4
	17	97 36.5		35 51.7	38.1	356 19.0	57.9	76 28.2	44.5	121 09.0	17.4			
	18	112 39.0		50 51.1 N22	38.8	11 20.0 N24	57.7	91 30.1 N 7	44.7	136 11.2 S11	17.3	Kochab	137 18.6 N74	03.5
	19	127 41.4		65 50.5	39.4	26 21.0	57.6	106 32.0	44.9	151 13.4	17.3	Markab	13 31.6 N15	19.6
	20	142 43.9		80 50.0	40.1	41 22.0	57.5	121 33.9	45.2	166 15.7	17.2	Menkar	314 08.0 N 4	10.7
	21	157 46.4		95 49.4	40.8	56 23.1	57.3	136 35.8	45.4	181 17.9	17.1	Menkent	147 59.0 S36	29.1
	22	172 48.8		110 48.8	41.5	71 24.1	57.2	151 37.7	45.6	196 20.2	17.0	Miaplacidus	221 38.2 S69	49.0
	23	187 51.3		125 48.2	42.1	86 25.1	57.1	166 39.6	45.8	211 22.4	16.9			
15	00	202 53.8		140 47.6 N22	42.8	101 26.1 N24	57.0	181 41.5 N 7	46.1	226 24.7 S11	16.9	Mirfak	308 30.8 N49	56.6
	01	217 56.2		155 47.0	43.4	116 27.1	56.8	196 43.4	46.3	241 26.9	16.8	Nunki	75 49.5 S26	16.1
	02	232 58.7		170 46.4	44.1	131 28.2	56.7	211 45.3	46.5	256 29.2	16.7	Peacock	53 08.1 S56	39.5
	03	248 01.2		185 45.8	44.8	146 29.2	56.6	226 47.2	46.7	271 31.4	16.6	Pollux	243 19.1 N27	58.3
	04	263 03.6		200 45.2	45.4	161 30.2	56.4	241 49.1	47.0	286 33.7	16.6	Procyon	244 52.4 N 5	09.9
	05	278 06.1		215 44.6	46.1	176 31.2	56.3	256 51.0	47.2	301 35.9	16.5			
	06	293 08.5		230 44.0 N22	46.7	191 32.2 N24	56.2	271 52.9 N 7	47.4	316 38.1 S11	16.4	Rasalhague	95 59.7 N12	32.4
	07	308 11.0		245 43.4	47.4	206 33.3	56.1	286 54.8	47.6	331 40.4	16.3	Regulus	207 35.8 N11	51.2
	08	323 13.5		260 42.8	48.1	221 34.3	55.9	301 56.7	47.9	346 42.6	16.3	Rigel	281 05.5 S 8	10.6
	09	338 15.9		275 42.2	48.7	236 35.3	55.8	316 58.6	48.1	1 44.9	16.2	Rigil Kent.	139 41.7 S60	55.8
	10	353 18.4		290 41.6	49.4	251 36.3	55.7	332 00.5	48.3	16 47.1	16.1	Sabik	102 04.3 S15	45.3
	11	8 20.9		305 41.0	50.0	266 37.3	55.5	347 02.4	48.5	31 49.4	16.0			
	12	23 23.3		320 40.4 N22	50.7	281 38.4 N24	55.4	2 04.3 N 7	48.8	46 51.6 S11	16.0	Schedar	349 33.3 N56	39.7
	13	38 25.8		335 39.8	51.3	296 39.4	55.3	17 06.2	49.0	61 53.9	15.9	Shaula	96 12.1 S37	07.2
	14	53 28.3		350 39.2	52.0	311 40.4	55.1	32 08.1	49.2	76 56.1	15.8	Sirius	258 27.6 S16	45.0
	15	68 30.7		5 38.6	52.6	326 41.4	55.0	47 10.0	49.4	91 58.4	15.7	Spica	158 23.5 S11	17.0
	16	83 33.2		20 38.0	53.3	341 42.4	54.9	62 11.9	49.6	107 00.6	15.6	Suhail	222 47.2 S43	31.8
	17	98 35.7		35 37.4	53.9	356 43.5	54.7	77 13.8	49.9	122 02.9	15.6			
	18	113 38.1		50 36.8 N22	54.6	11 44.5 N24	54.6	92 15.7 N 7	50.1	137 05.1 S11	15.5	Vega	80 34.1 N38	48.0
	19	128 40.6		65 36.2	55.2	26 45.5	54.5	107 17.6	50.3	152 07.4	15.4	Zuben'ubi	136 57.3 S16	08.4
	20	143 43.0		80 35.6	55.9	41 46.5	54.3	122 19.5	50.5	167 09.6	15.3			
	21	158 45.5		95 35.0	56.5	56 47.5	54.2	137 21.4	50.8	182 11.9	15.3			
	22	173 48.0		110 34.4	57.1	71 48.6	54.1	152 23.3	51.0	197 14.1	15.2	Venus	299 07.2 14 36	
	23	188 50.4		125 33.8	57.8	86 49.6	53.9	167 25.2	51.2	212 16.3	15.1	Mars	259 06.9 17 15	
h m												Jupiter	339 01.3 11 55	
Mer.Pass. 10 30.6				v −0.6 d 0.7		v 1.0 d 0.1		v 1.9 d 0.2		v 2.2 d 0.1		Saturn	23 36.2 8 57	

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise						
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	13	14	15	16		
d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m
THURSDAY	13	00	179 49.5	N 8 52.3	270 55.3	4.2	S27 16.4	4.0	59.1	N 72	////	02 10	03 47				06 22
	01	194 49.6	53.2	285 18.5	4.2	27 12.4	4.2	59.1	N 70	////	02 43	04 02			07 16	05 54	
	02	209 49.8	54.1	289 41.7	4.2	27 08.2	4.4	59.1	68	01 01	03 07	04 15			06 15	05 33	
	03	224 50.0	55.0	314 04.9	4.3	27 03.8	4.5	59.1	66	01 52	03 25	04 25		07 02	05 40	05 16	
	04	239 50.1	55.9	328 28.2	4.3	26 59.3	4.7	59.1	64	02 22	03 39	04 34		05 36	05 14	05 02	
	05	254 50.3	56.8	342 51.5	4.3	26 54.6	4.9	59.1	62	02 44	03 51	04 41	05 04	04 59	04 54	04 50	
	06	269 50.4	57.7	357 14.8	4.4	S26 49.7	5.1	59.1	60	03 01	04 02	04 47	04 17	04 32	04 38	04 40	
	07	284 50.6	58.6	11 38.2	4.5	26 44.6	5.3	59.1	N 58	03 15	04 10	04 53	03 46	04 11	04 24	04 31	
	08	299 50.7	59.5	26 01.7	4.5	26 39.3	5.4	59.2	56	03 27	04 18	04 58	03 23	03 53	04 12	04 23	
	09	314 50.9	60.4	40 25.2	4.5	26 33.9	5.7	59.2	54	03 38	04 25	05 02	03 04	03 39	04 01	04 11	
	10	329 51.1	61.4	54 48.7	4.6	26 28.2	5.8	59.2	52	03 47	04 31	05 06	02 48	03 26	03 51	04 10	
	11	344 51.2	62.3	69 12.3	4.6	26 22.4	6.0	59.2	50	03 54	04 36	05 10	02 34	03 14	03 43	04 05	
	12	359 51.4	63.2	83 35.9	4.7	S26 16.4	6.1	59.2	45	04 10	04 47	05 18	02 06	02 50	03 25	03 52	
	13	14 51.5	64.1	97 59.6	4.7	26 10.3	6.4	59.2	N 40	04 23	04 56	05 24	01 44	02 31	03 10	03 42	
	14	29 51.7	65.0	112 23.3	4.8	26 03.9	6.5	59.2	35	04 33	05 04	05 30	01 25	02 15	02 57	03 33	
	15	44 51.9	65.9	126 47.1	4.9	25 57.4	6.7	59.2	30	04 41	05 10	05 35	01 09	02 01	02 46	03 25	
	16	59 52.0	66.8	141 11.0	4.9	25 50.7	6.8	59.2	20	04 54	05 21	05 43	00 42	01 37	02 27	03 12	
	17	74 52.2	67.7	155 34.9	4.9	25 43.9	7.0	59.3	N 10	05 04	05 29	05 50	00 19	01 17	02 10	03 00	
	18	89 52.3	68.6	169 58.8	5.1	S25 36.9	7.2	59.3	0	05 12	05 36	05 57	24 57	00 57	01 55	02 49	
	19	104 52.5	69.5	184 22.9	5.1	25 29.7	7.4	59.3	S 10	05 18	05 42	06 04	24 38	00 38	01 39	02 37	
	20	119 52.6	70.4	198 47.0	5.1	25 22.3	7.5	59.3	20	05 23	05 48	06 10	24 17	00 17	01 22	02 25	
	21	134 52.8	71.3	213 11.1	5.3	25 14.8	7.7	59.3	30	05 26	05 54	06 18	23 53	25 03	01 03	02 12	
	22	149 53.0	72.2	227 35.4	5.3	25 07.1	7.9	59.3	35	05 28	05 57	06 23	23 39	24 51	00 51	02 04	
23	164 53.1	73.1	241 59.7	5.3	24 59.2	8.0	59.3	40	05 29	06 00	06 28	23 22	24 38	00 38	01 54		
								45	05 30	06 04	06 33	23 02	24 22	00 22	01 44		
FRIDAY	14	00	179 53.3	N 9 14.0	256 24.0	5.5	S24 51.2	8.2	59.3	S 50	05 30	06 07	06 40	22 37	24 03	00 03	01 30
	01	194 53.4	14.9	270 48.5	5.5	24 43.0	8.4	59.3	52	05 30	06 09	06 43	22 25	23 54	25 24	01 24	
	02	209 53.6	15.8	285 13.0	5.6	24 34.6	8.5	59.3	54	05 30	06 11	06 47	22 11	23 44	25 17	01 17	
	03	224 53.7	16.7	299 37.6	5.6	24 26.1	8.7	59.4	56	05 30	06 13	06 51	21 55	23 32	25 10	01 10	
	04	239 53.9	17.6	314 02.2	5.8	24 17.4	8.8	59.4	58	05 29	06 15	06 55	21 35	23 18	25 01	01 01	
	05	254 54.0	18.5	328 27.0	5.8	24 08.6	9.0	59.4	S 60	05 29	06 17	07 00	21 11	23 02	24 51	00 51	
	06	269 54.2	N 9 19.4	342 51.8	5.8	S23 59.6	9.2	59.4									
	07	284 54.4	20.3	357 16.6	6.0	23 50.4	9.3	59.4	Lat.	Sunset	Twilight		Moonset				
	08	299 54.5	21.2	11 41.6	6.0	23 41.1	9.4	59.4			Civil	Naut.	13	14	15	16	
	09	314 54.7	22.1	26 06.6	6.1	23 31.7	9.7	59.4									
	10	329 54.8	23.1	40 31.7	6.2	23 22.0	9.7	59.4									
	11	344 55.0	24.0	54 56.9	6.3	23 12.3	9.9	59.4	N 72	20 18	21 58	////				12 10	
	12	359 55.1	N 9 24.9	69 22.2	6.4	S23 02.4	10.1	59.4	N 70	20 01	21 23	////			09 22	12 35	
	13	14 55.3	25.8	83 47.6	6.4	22 52.3	10.2	59.4	68	19 48	20 58	23 15			10 21	12 54	
	14	29 55.4	26.7	98 13.0	6.5	22 42.1	10.3	59.4	66	19 38	20 39	22 15		07 34	10 55	13 09	
	15	44 55.6	27.6	112 38.5	6.6	22 31.8	10.5	59.5	64	19 29	20 24	21 43		08 59	11 19	13 22	
	16	59 55.7	28.5	127 04.1	6.7	22 21.3	10.7	59.5	62	19 21	20 11	21 20	07 26	09 36	11 38	13 32	
	17	74 55.9	29.4	141 29.8	6.8	22 10.6	10.7	59.5	60	19 15	20 01	21 02	08 12	10 02	11 54	13 41	
	18	89 56.0	N 9 30.3	155 55.6	6.8	S21 59.9	10.9	59.5	N 58	19 09	19 52	20 48	08 43	10 23	12 07	13 48	
	19	104 56.2	31.1	170 21.4	7.0	21 49.0	11.1	59.5	56	19 04	19 44	20 35	09 06	10 40	12 18	13 55	
	20	119 56.4	32.0	184 47.4	7.0	21 37.9	11.2	59.5	54	19 00	19 37	20 25	09 24	10 54	12 28	14 01	
	21	134 56.5	32.9	199 13.4	7.1	21 26.7	11.3	59.5	52	18 55	19 31	20 16	09 40	11 06	12 37	14 06	
	22	149 56.7	33.8	213 39.5	7.2	21 15.4	11.4	59.5	50	18 52	19 26	20 08	09 54	11 17	12 44	14 11	
23	164 56.8	34.7	228 05.7	7.2	21 04.0	11.6	59.5	45	18 44	19 14	19 51	10 21	11 40	13 01	14 22		
SATURDAY	15	00	179 57.0	N 9 35.6	242 31.9	7.4	S20 52.4	11.7	59.5	N 40	18 37	19 05	19 39	10 43	11 58	13 14	14 30
	01	194 57.1	36.5	256 58.3	7.4	20 40.7	11.9	59.5	35	18 31	18 57	19 28	11 01	12 13	13 26	14 37	
	02	209 57.3	37.4	271 24.7	7.6	20 28.0	11.9	59.5	30	18 26	18 51	19 20	11 17	12 26	13 36	14 44	
	03	224 57.4	38.3	285 51.3	7.6	20 16.9	12.1	59.5	20	18 18	18 40	19 07	11 43	12 48	13 53	14 55	
	04	239 57.6	39.2	300 17.9	7.7	20 04.8	12.2	59.5	N 10	18 10	18 32	18 57	12 05	13 07	14 07	15 04	
	05	254 57.7	40.1	314 44.6	7.8	19 52.6	12.4	59.5	0	18 04	18 25	18 49	12 26	13 25	14 21	15 13	
	06	269 57.9	N 9 41.0	329 11.4	7.8	S19 40.2	12.4	59.5	S 10	17 57	18 18	18 43	12 47	13 43	14 34	15 22	
	07	284 58.0	41.9	343 38.2	8.0	19 27.8	12.6	59.5	20	17 50	18 12	18 38	13 09	14 01	14 49	15 31	
	08	299 58.2	42.8	358 05.2	8.0	19 15.2	12.7	59.6	30	17 42	18 06	18 34	13 34	14 23	15 05	15 42	
	09	314 58.3	43.7	12 32.2	8.1	19 02.5	12.8	59.6	35	17 38	18 03	18 32	13 49	14 35	15 14	15 48	
	10	329 58.5	44.6	26 59.3	8.2	18 49.7	12.9	59.6	40	17 32	18 00	18 31	14 07	14 50	15 25	15 54	
	11	344 58.6	45.5	41 26.5	8.3	18 36.8	13.0	59.6	45	17 27	17 56	18 30	14 27	15 07	15 37	16 02	
	12	359 58.8	N 9 46.4	55 53.8	8.4	S18 23.8	13.2	59.6	S 50	17 20	17 52	18 30	14 53	15 27	15 52	16 12	
	13	14 58.9	47.3	70 21.2	8.4	18 10.6	13.2	59.6	52	17 16	17 51	18 30	15 06	15 37	15 59	16 16	
	14	29 59.1	48.2	84 48.6	8.6	17 57.4	13.4	59.6	54	17 13	17 49	18 30	15 20	15 48	16 07	16 21	
	15	44 59.2	49.1	99 16.2	8.6	17 44.0	13.4	59.6	56	17 09	17 47	18 30	15 37	16 01	16 15	16 26	
	16	59 59.4	50.0	113 43.8	8.7	17 30.6	13.6	59.6	58	17 05	17 45	18 30	15 57	16 15	16 25	16 31	
	17	74 59.5	50.9	128 11.5	8.8	17 17.0	13.6	59.6	S 60	17 00	17 42	18 30	16 21	16 32	16 36	16 38	
	18	89 59.7	N 9 51.7	142 39.3	8.8	S17 03.4	13.8	59.6			SUN		MOON				
	19	104 59.8	52.6	157 07.1	8.9	16 49.6	13.9	59.6									
	20	120 00.0	53.5	171 35.0	9.1	16 35.7	13.9	59.6	Day		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase	
	21	135 00.1	54.4	186 03.1	9.1	16 21.8	14.1	59.6		00 ^h	12 ^h	Pass.	Upper	Lower			
	22	150 00.3	55.3	200 31.2	9.1	16 07.7	14.1	59.6	d	m s	m s	h m	h m	h m	d	%	
23	165 00.4	56.2	214 59.3	9.3	S15 53.6	14.2	59.6	13	00 42	00 35	12 01	06 11	18 42	23 49			
								14	00 27	00 20	12 00	07 11	19 40	24 37			
								15	00 12	00 05	12 00	08 08	20 35	25 27			
			SD 16.0	d 0.9	SD	16.1	16.2	16.2									

UT	ARIES		VENUS -4.1		MARS +1.2		JUPITER -2.0		SATURN +0.9		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
SUNDAY	00	203 52.9	140 33.2	N22 58.4	101 50.6	N24 53.8	182 27.1	N 7 51.4	227 18.6	S11 15.0	Acamar	315 13.3	S40 12.8
	01	218 55.4	155 32.6	59.1	116 51.6	53.7	197 29.0	51.7	242 20.8	15.0	Achernar	335 21.8	S57 07.2
	02	233 57.8	170 32.0	22 59.7	131 52.6	53.5	212 30.9	51.9	257 23.1	14.9	Acruhs	173 01.1	S63 13.8
	03	249 00.3	185 31.4	23 00.3	146 53.6	53.4	227 32.8	52.1	272 25.3	14.8	Adhara	255 07.1	S29 00.4
	04	264 02.8	200 30.8	01.0	161 54.7	53.3	242 34.7	52.3	287 27.6	14.7	Aldebaran	290 41.5	N16 33.3
	05	279 05.2	215 30.2	01.6	176 55.7	53.1	257 36.6	52.6	302 29.8	14.7			
	06	294 07.7	230 29.6	N23 02.2	191 56.7	N24 53.0	272 38.5	N 7 52.8	317 32.1	S11 14.6	Alioth	166 13.7	N55 50.1
	07	309 10.2	245 29.0	02.9	206 57.7	52.8	287 40.4	53.0	332 34.3	14.5	Alkaid	152 52.7	N49 11.8
	08	324 12.6	260 28.4	03.5	221 58.7	52.7	302 42.3	53.2	347 36.6	14.4	Alnair	27 35.0	S46 50.8
	09	339 15.1	275 27.8	04.1	236 59.7	52.6	317 44.2	53.5	2 38.8	14.4	Alnilam	275 39.4	S 1 11.3
	10	354 17.5	290 27.2	04.8	252 00.8	52.4	332 46.1	53.7	17 41.1	14.3	Alphard	217 49.1	S 8 45.7
	11	9 20.0	305 26.6	05.4	267 01.8	52.3	347 48.0	53.9	32 43.3	14.2			
	12	24 22.5	320 26.0	N23 06.0	282 02.8	N24 52.2	2 49.9	N 7 54.1	47 45.6	S11 14.1	Alphecca	126 04.6	N26 38.0
	13	39 24.9	335 25.4	06.7	297 03.8	52.0	17 51.8	54.3	62 47.8	14.1	Alpheratz	357 36.6	N29 12.9
	14	54 27.4	350 24.8	07.3	312 04.8	51.9	32 53.7	54.6	77 50.1	14.0	Altair	62 01.4	N 8 55.6
	15	69 29.9	5 24.2	07.9	327 05.8	51.8	47 55.6	54.8	92 52.3	13.9	Ankaa	353 09.0	S42 10.8
	16	84 32.3	20 23.6	08.5	342 06.9	51.6	62 57.5	55.0	107 54.6	13.8	Antares	112 17.3	S26 29.0
	17	99 34.8	35 23.0	09.2	357 07.9	51.5	77 59.4	55.2	122 56.8	13.8			
	18	114 37.3	50 22.4	N23 09.8	12 08.9	N24 51.3	93 01.3	N 7 55.5	137 59.1	S11 13.7	Arcturus	145 48.9	N19 03.6
	19	129 39.7	65 21.7	10.4	27 09.9	51.2	108 03.2	55.7	153 01.3	13.6	Atria	107 12.5	S69 04.0
	20	144 42.2	80 21.1	11.0	42 10.9	51.1	123 05.1	55.9	168 03.6	13.5	Avior	234 15.3	S59 35.3
	21	159 44.6	95 20.5	11.6	57 11.9	50.9	138 07.0	56.1	183 05.8	13.5	Bellatrix	278 24.6	N 6 22.2
	22	174 47.1	110 19.9	12.3	72 13.0	50.8	153 08.9	56.4	198 08.1	13.4	Betelgeuse	270 53.8	N 7 24.6
	23	189 49.6	125 19.3	12.9	87 14.0	50.6	168 10.8	56.6	213 10.3	13.3			
MONDAY	00	204 52.0	140 18.7	N23 13.5	102 15.0	N24 50.5	183 12.7	N 7 56.8	228 12.6	S11 13.2	Canopus	263 53.2	S52 42.7
	01	219 54.5	155 18.1	14.1	117 16.0	50.4	198 14.6	57.0	243 14.8	13.2	Capella	280 24.3	N46 01.4
	02	234 57.0	170 17.5	14.7	132 17.0	50.2	213 16.5	57.3	258 17.1	13.1	Deneb	49 26.9	N45 21.4
	03	249 59.4	185 16.9	15.3	147 18.0	50.1	228 18.4	57.5	273 19.3	13.0	Denebola	182 26.2	N14 26.5
	04	265 01.9	200 16.3	15.9	162 19.0	49.9	243 20.3	57.7	288 21.6	12.9	Diphda	348 49.1	S17 51.7
	05	280 04.4	215 15.7	16.6	177 20.1	49.8	258 22.2	57.9	303 23.8	12.9			
	06	295 06.8	230 15.1	N23 17.2	192 21.1	N24 49.7	273 24.1	N 7 58.1	318 26.1	S11 12.8	Dubhe	193 42.3	N61 37.7
	07	310 09.3	245 14.5	17.8	207 22.1	49.5	288 26.0	58.4	333 28.3	12.7	Elnath	278 03.9	N28 37.6
	08	325 11.8	260 13.9	18.4	222 23.1	49.4	303 27.9	58.6	348 30.6	12.6	Eltanin	90 42.6	N51 28.8
	09	340 14.2	275 13.2	19.0	237 24.1	49.2	318 29.8	58.8	3 32.8	12.6	Enif	33 40.4	N 9 58.7
	10	355 16.7	290 12.6	19.6	252 25.1	49.1	333 31.7	59.0	18 35.1	12.5	Fomalhaut	15 16.4	S29 30.0
	11	10 19.1	305 12.0	20.2	267 26.1	48.9	348 33.6	59.3	33 37.3	12.4			
	12	25 21.6	320 11.4	N23 20.8	282 27.2	N24 48.8	3 35.5	N 7 59.5	48 39.6	S11 12.3	Gacrux	171 52.7	S57 14.7
	13	40 24.1	335 10.8	21.4	297 28.2	48.7	18 37.4	59.7	63 41.9	12.3	Gienah	175 44.8	S17 40.4
	14	55 26.5	350 10.2	22.0	312 29.2	48.5	33 39.3	7 59.9	78 44.1	12.2	Hadar	148 37.5	S60 29.1
	15	70 29.0	5 09.6	22.6	327 30.2	48.4	48 41.2	8 00.2	93 46.4	12.1	Hamal	327 53.2	N23 34.2
	16	85 31.5	20 09.0	23.2	342 31.2	48.2	63 43.1	00.4	108 48.6	12.0	Kaus Aust.	83 34.3	S34 22.4
	17	100 33.9	35 08.4	23.8	357 32.2	48.1	78 45.0	00.6	123 50.9	12.0			
	18	115 36.4	50 07.8	N23 24.4	12 33.2	N24 47.9	93 46.9	N 8 00.8	138 53.1	S11 11.9	Kochab	137 18.6	N74 03.5
	19	130 38.9	65 07.1	25.0	27 34.2	47.8	108 48.8	01.0	153 55.4	11.8	Markab	13 31.6	N15 19.6
	20	145 41.3	80 06.5	25.6	42 35.3	47.7	123 50.7	01.3	168 57.6	11.8	Menkar	314 08.0	N 4 10.7
	21	160 43.8	95 05.9	26.2	57 36.3	47.5	138 52.5	01.5	183 59.9	11.7	Menkent	147 59.0	S36 29.1
	22	175 46.2	110 05.3	26.8	72 37.3	47.4	153 54.4	01.7	199 02.1	11.6	Miaplacidus	221 38.3	S69 49.0
	23	190 48.7	125 04.7	27.4	87 38.3	47.2	168 56.3	01.9	214 04.4	11.5			
TUESDAY	00	205 51.2	140 04.1	N23 28.0	102 39.3	N24 47.1	183 58.2	N 8 02.2	229 06.6	S11 11.5	Mirfak	308 30.8	N49 56.6
	01	220 53.6	155 03.5	28.5	117 40.3	46.9	199 00.1	02.4	244 08.9	11.4	Nunki	75 49.5	S26 16.1
	02	235 56.1	170 02.9	29.1	132 41.3	46.8	214 02.0	02.6	259 11.1	11.3	Peacock	53 08.1	S56 39.4
	03	250 58.6	185 02.2	29.7	147 42.3	46.6	229 03.9	02.8	274 13.4	11.2	Pollux	243 19.1	N27 58.3
	04	266 01.0	200 01.6	30.3	162 43.3	46.5	244 05.8	03.0	289 15.6	11.2	Procyon	244 52.4	N 5 09.9
	05	281 03.5	215 01.0	30.9	177 44.4	46.3	259 07.7	03.3	304 17.9	11.1			
	06	296 06.0	230 00.4	N23 31.5	192 45.4	N24 46.2	274 09.6	N 8 03.5	319 20.2	S11 11.0	Rasalhague	95 59.7	N12 32.4
	07	311 08.4	244 59.8	32.1	207 46.4	46.0	289 11.5	03.7	334 22.4	10.9	Regulus	207 35.8	N11 51.2
	08	326 10.9	259 59.2	32.6	222 47.4	45.9	304 13.4	03.9	349 24.7	10.9	Rigel	281 05.5	S 8 10.6
	09	341 13.4	274 58.6	33.2	237 48.4	45.8	319 15.3	04.2	4 26.9	10.8	Rigel Kent.	139 41.7	S60 55.8
	10	356 15.8	289 57.9	33.8	252 49.4	45.6	334 17.2	04.4	19 29.2	10.7	Sabik	102 04.2	S15 45.3
	11	11 18.3	304 57.3	34.4	267 50.4	45.5	349 19.1	04.6	34 31.4	10.6			
	12	26 20.7	319 56.7	N23 35.0	282 51.4	N24 45.3	4 21.0	N 8 04.8	49 33.7	S11 10.6	Schedar	349 33.3	N56 39.7
	13	41 23.2	334 56.1	35.5	297 52.4	45.2	19 22.9	05.1	64 35.9	10.5	Shaula	96 12.1	S37 07.2
	14	56 25.7	349 55.5	36.1	312 53.4	45.0	34 24.8	05.3	79 38.2	10.4	Sirius	258 27.6	S16 45.0
	15	71 28.1	4 54.9	36.7	327 54.5	44.9	49 26.7	05.5	94 40.4	10.4	Spica	158 23.5	S11 17.0
	16	86 30.6	19 54.3	37.3	342 55.5	44.7	64 28.6	05.7	109 42.7	10.3	Suhail	222 47.3	S43 31.8
	17	101 33.1	34 53.6	37.8	357 56.5	44.6	79 30.5	05.9	124 45.0	10.2			
	18	116 35.5	49 53.0	N23 38.4	12 57.5	N24 44.4	94 32.4	N 8 06.2	139 47.2	S11 10.1	Vega	80 34.1	N38 48.0
	19	131 38.0	64 52.4	39.0	27 58.5	44.3	109 34.3	06.4	154 49.5	10.1	Zuben'ubi	136 57.3	S16 08.4
	20	146 40.5	79 51.8	39.5	42 59.5	44.1	124 36.2	06.6	169 51.7	10.0		SHA	Mer.Pass
	21	161 42.9	94 51.2	40.1	58 00.5	44.0	139 38.1	06.8	184 54.0	09.9	Venus	295 26.7	14 39
	22	176 45.4	109 50.6	40.7	73 01.5	43.8	154 40.0	07.1	199 56.2	09.8	Mars	257 22.9	17 10
	23	191 47.8	124 49.9	41.3	88 02.5	43.7	169 41.9	07.3	214 58.5	09.8	Jupiter	338 20.6	11 46
		h m									Saturn	23 20.5	8 46
Mer. Pass. 10		18.8	v -0.6	d 0.6	v 1.0	d 0.1	v 1.9	d 0.2	v 2.3	d 0.1			

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
										16	17		18	19			
	GHA	Dec	GHA	ν	Dec	d	HP	Naut.							Civil	h m	h m
SUNDAY	d h	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	N 72	h m	h m	h m	h m	h m	h m	h m	h m	h m
	00	180 00.6 N 9 57.1	229 27.6 9.3 S15 39.4 14.4 59.6					N 70	////	01 40	03 29	06 22	05 29	04 51	04 16		
	01	195 00.7 58.0	243 55.9 9.4 15 25.0 14.4 59.6					68	////	02 23	03 47	05 54	05 17	04 49	04 22		
	02	210 00.9 58.9	258 24.3 9.5 15 10.6 14.5 59.6					66	01 27	03 11	04 13	05 16	04 59	04 45	04 31		
	03	225 01.0 9 59.8	272 52.8 9.5 14 56.1 14.6 59.6					64	02 04	03 27	04 23	05 02	04 52	04 44	04 35		
	04	240 01.2 10 00.7	287 21.3 9.7 14 41.5 14.6 59.6					62	02 30	03 41	04 31	04 50	04 46	04 42	04 38		
	05	255 01.3 01.5	301 50.0 9.7 14 26.9 14.8 59.6					60	02 49	03 52	04 39	04 40	04 41	04 41	04 41		
	06	270 01.5 N10 02.4	316 18.7 9.7 S14 12.1 14.8 59.6					N 58	03 05	04 01	04 45	04 31	04 36	04 40	04 44		
	07	285 01.6 03.3	330 47.4 9.9 13 57.3 14.9 59.6					56	03 18	04 10	04 50	04 23	04 32	04 39	04 46		
	08	300 01.8 04.2	345 16.3 9.9 13 42.4 15.0 59.6					54	03 29	04 17	04 55	04 17	04 28	04 38	04 48		
	09	315 01.9 05.1	359 45.2 10.0 13 27.4 15.0 59.6					52	03 39	04 24	05 00	04 10	04 25	04 38	04 50		
	10	330 02.1 06.0	14 14.2 10.0 13 12.4 15.1 59.6					50	03 47	04 29	05 04	04 05	04 22	04 37	04 52		
	11	345 02.2 06.9	28 43.2 10.1 12 57.3 15.2 59.6					45	04 04	04 42	05 13	03 52	04 15	04 36	04 56		
	12	0 02.4 N10 07.8	43 12.3 10.2 S12 42.1 15.3 59.6					N 40	04 18	04 52	05 20	03 42	04 09	04 34	04 59		
	13	15 02.5 08.6	57 41.5 10.3 12 26.8 15.3 59.6					35	04 29	05 00	05 26	03 33	04 04	04 33	05 02		
	14	30 02.6 09.5	72 10.8 10.3 12 11.5 15.4 59.6					30	04 38	05 07	05 31	03 25	04 00	04 32	05 04		
	15	45 02.8 10.4	86 40.1 10.4 11 56.1 15.5 59.6					20	04 52	05 18	05 41	03 12	03 53	04 31	05 08		
	16	60 02.9 11.3	101 09.5 10.4 11 40.6 15.5 59.6					N 10	05 02	05 27	05 49	03 00	03 46	04 29	05 12		
	17	75 03.1 12.2	115 38.9 10.5 11 25.1 15.6 59.6					0	05 11	05 35	05 56	02 49	03 39	04 28	05 16		
	18	90 03.2 N10 13.1	130 08.4 10.6 S11 09.5 15.7 59.6					S 10	05 18	05 42	06 04	02 37	03 33	04 27	05 20		
	19	105 03.4 14.0	144 38.0 10.6 10 53.8 15.7 59.6					20	05 23	05 49	06 11	02 25	03 26	04 25	05 24		
	20	120 03.5 14.8	159 07.6 10.7 10 38.1 15.7 59.6					30	05 28	05 56	06 20	02 12	03 19	04 24	05 28		
	21	135 03.7 15.7	173 37.3 10.7 10 22.4 15.8 59.5					35	05 30	05 59	06 25	02 04	03 14	04 23	05 31		
	22	150 03.8 16.6	188 07.0 10.8 10 06.6 15.9 59.5					40	05 32	06 03	06 31	01 54	03 09	04 22	05 34		
	23	165 04.0 17.5	202 36.8 10.9 9 50.7 15.9 59.5					45	05 33	06 07	06 37	01 44	03 03	04 21	05 37		
MONDAY	00	180 04.1 N10 18.4	217 06.7 10.9 S 9 34.8 16.0 59.5					S 50	05 34	06 12	06 45	01 30	02 56	04 19	05 42		
	01	195 04.2 19.3	231 36.6 11.0 9 18.8 16.0 59.5					52	05 35	06 14	06 48	01 24	02 53	04 19	05 44		
	02	210 04.4 20.2	246 06.6 11.0 9 02.8 16.0 59.5					54	05 35	06 16	06 52	01 17	02 49	04 18	05 46		
	03	225 04.5 21.0	260 36.6 11.0 8 46.8 16.1 59.5					56	05 35	06 18	06 57	01 10	02 45	04 17	05 48		
	04	240 04.7 21.9	275 06.6 11.2 8 30.7 16.2 59.5					58	05 35	06 21	07 01	01 01	02 40	04 16	05 51		
	05	255 04.8 22.8	289 36.8 11.1 8 14.5 16.2 59.5					S 60	05 36	06 24	07 07	00 51	02 35	04 16	05 54		
	06	270 05.0 N10 23.7	304 06.9 11.2 S 7 58.3 16.2 59.5					Lat.	Sunset	Twilight		Moonset					
	07	285 05.1 24.6	318 37.1 11.3 7 42.1 16.3 59.5				Civil			Naut.	16	17	18	19			
	08	300 05.3 25.4	333 07.4 11.3 7 25.8 16.3 59.5					h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	09	315 05.4 26.3	347 37.7 11.3 7 09.5 16.3 59.5														
	10	330 05.5 27.2	2 08.0 11.4 6 53.2 16.3 59.5					N 72	h m	h m	h m	h m	h m	h m	h m	h m	h m
	11	345 05.7 28.1	16 38.4 11.5 6 36.9 16.4 59.5					N 70	20 34	22 28	////	12 10	14 49	17 11	19 35		
	12	0 05.8 N10 29.0	31 08.9 11.5 S 6 20.5 16.5 59.4					N 70	20 15	21 42	////	12 35	14 58	17 09	19 21		
	13	15 06.0 29.8	45 39.4 11.5 6 04.0 16.4 59.4					68	20 00	21 13	////	12 54	15 05	17 07	19 10		
	14	30 06.1 30.7	60 09.9 11.5 5 47.6 16.5 59.4					66	19 48	20 52	22 41	13 09	15 10	17 06	19 01		
	15	45 06.3 31.6	74 40.4 11.6 5 31.1 16.5 59.4					64	19 38	20 35	22 00	13 22	15 15	17 04	18 53		
	16	60 06.4 32.5	89 11.0 11.7 5 14.6 16.5 59.4					62	19 30	20 21	21 33	13 32	15 19	17 03	18 46		
	17	75 06.5 33.4	103 41.7 11.6 4 58.1 16.5 59.4					60	19 22	20 09	21 13	13 41	15 23	17 02	18 41		
	18	90 06.7 N10 34.2	118 12.3 11.7 S 4 41.6 16.6 59.4					N 58	19 16	20 00	20 57	13 48	15 26	17 01	18 36		
	19	105 06.8 35.1	132 43.0 11.8 4 25.0 16.6 59.4					56	19 10	19 51	20 44	13 55	15 29	17 01	18 31		
	20	120 07.0 36.0	147 13.8 11.7 4 08.4 16.6 59.4					54	19 05	19 44	20 32	14 01	15 32	17 00	18 27		
	21	135 07.1 36.9	161 44.5 11.8 3 51.8 16.6 59.4					52	19 01	19 37	20 22	14 06	15 34	16 59	18 24		
	22	150 07.2 37.8	176 15.3 11.8 3 35.2 16.6 59.3					50	18 56	19 31	20 14	14 11	15 36	16 59	18 21		
	23	165 07.4 38.6	190 46.1 11.9 3 18.6 16.6 59.3					45	18 48	19 18	19 56	14 22	15 40	16 57	18 14		
	TUESDAY	00	180 07.5 N10 39.5	205 17.0 11.9 S 3 02.0 16.7 59.3					N 40	18 40	19 08	19 42	14 30	15 44	16 56	18 08	
01		195 07.7 40.4	219 47.9 11.9 2 45.3 16.6 59.3					35	18 34	19 00	19 31	14 37	15 47	16 55	18 03		
02		210 07.8 41.3	234 18.8 11.9 2 28.7 16.7 59.3					30	18 28	18 53	19 22	14 44	15 50	16 55	17 59		
03		225 07.9 42.1	248 49.7 12.0 2 12.0 16.7 59.3					20	18 19	18 41	19 08	14 55	15 55	16 53	17 51		
04		240 08.1 43.0	263 20.7 12.0 1 55.3 16.6 59.3					N 10	18 11	18 32	18 57	15 04	15 59	16 52	17 45		
05		255 08.2 43.9	277 51.7 12.0 1 38.7 16.7 59.3					0	18 03	18 24	18 48	15 13	16 03	16 51	17 39		
06		270 08.4 N10 44.8	292 22.7 12.0 S 1 22.0 16.7 59.2					S 10	17 55	18 17	18 41	15 22	16 07	16 50	17 32		
07		285 08.5 45.6	306 53.7 12.0 1 05.3 16.6 59.2					20	17 48	18 10	18 36	15 31	16 11	16 48	17 26		
08		300 08.6 46.5	321 24.7 12.1 0 48.7 16.7 59.2					30	17 39	18 03	18 31	15 42	16 15	16 47	17 19		
09		315 08.8 47.4	335 55.8 12.0 0 32.0 16.7 59.2					35	17 34	17 59	18 29	15 48	16 18	16 46	17 14		
10		330 08.9 48.3	350 26.8 12.1 S 0 15.3 16.6 59.2					40	17 28	17 55	18 27	15 54	16 20	16 45	17 10		
11		345 09.1 49.1	4 57.9 12.1 N 0 01.3 16.6 59.2					45	17 21	17 51	18 25	16 02	16 24	16 44	17 04		
12		0 09.2 N10 50.0	19 29.0 12.2 N 0 17.9 16.7 59.2					S 50	17 14	17 47	18 24	16 12	16 28	16 43	16 57		
13		15 09.3 50.9	34 00.2 12.1 0 34.6 16.6 59.1					52	17 10	17 44	18 24	16 16	16 30	16 42	16 54		
14		30 09.5 51.7	48 31.3 12.1 0 51.2 16.6 59.1					54	17 06	17 42	18 23	16 21	16 31	16 41	16 51		
15		45 09.6 52.6	63 02.4 12.2 1 07.8 16.6 59.1					56	17 02	17 40	18 23	16 26	16 34	16 41	16 48		
16		60 09.7 53.5	77 33.6 12.1 1 24.4 16.6 59.1					58	16 57	17 37	18 23	16 31	16 36	16 40	16 44		
17		75 09.9 54.4	92 04.7 12.2 1 41.0 16.6 59.1					S 60	16 51	17 34	18 22	16 38	16 39	16 39	16 39		
18		90 10.0 N10 55.2	106 35.9 12.2 N 1 57.6 16.5 59.1					Day	SUN			MOON					
19	105 10.2 56.1	121 07.1 12.1 2 14.1 16.5 59.0				Eqn. of Time	Mer.		Mer. Pass.		Age		Phase				
20	120 10.3 57.0	135 38.2 12.2 2 30.6 16.5 59.0				00 ^h	12 ^h		Pass.	Upper							

UT	ARIES		VENUS -4.1		MARS +1.2		JUPITER -2.0		SATURN +0.9		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
WEDNESDAY	00	206 50.3	139 49.3	N23 41.8	103 03.5	N24 43.5	184 43.8	N 8 07.5	230 00.7	S11 09.7	Acamar	315 13.3	S40 12.8
	01	221 52.8	154 48.7	42.4	118 04.5	43.4	199 45.7	07.7	245 03.0	09.6	Achernar	335 21.8	S57 07.2
	02	236 55.2	169 48.1	42.9	133 05.6	43.2	214 47.6	07.9	260 05.3	09.6	Acrux	173 01.1	S63 13.8
	03	251 57.7	184 47.5	43.5	148 06.6	43.1	229 49.5	08.2	275 07.5	09.5	Adhara	255 07.1	S29 00.4
	04	267 00.2	199 46.8	44.1	163 07.6	42.9	244 51.4	08.4	290 09.8	09.4	Aldebaran	290 41.6	N16 33.3
	05	282 02.6	214 46.2	44.6	178 08.6	42.8	259 53.3	08.6	305 12.0	09.3			
	06	297 05.1	229 45.6	N23 45.2	193 09.6	N24 42.6	274 55.2	N 8 08.8	320 14.3	S11 09.3	Alioth	166 13.7	N55 50.1
	07	312 07.6	244 45.0	45.7	208 10.6	42.5	289 57.1	09.1	335 16.5	09.2	Alkaid	152 52.7	N49 11.8
	08	327 10.0	259 44.4	46.3	223 11.6	42.3	304 59.0	09.3	350 18.8	09.1	Alnair	27 35.0	S46 50.8
	09	342 12.5	274 43.8	46.9	238 12.6	42.1	320 00.9	09.5	5 21.0	09.0	Alnilam	275 39.4	S 1 11.3
	10	357 15.0	289 43.1	47.4	253 13.6	42.0	335 02.8	09.7	20 23.3	09.0	Alphard	217 49.1	S 8 45.7
	11	12 17.4	304 42.5	48.0	268 14.6	41.8	350 04.7	09.9	35 25.6	08.9			
	12	27 19.9	319 41.9	N23 48.5	283 15.6	N24 41.7	5 06.6	N 8 10.2	50 27.8	S11 08.8	Alphecca	126 04.6	N26 38.0
	13	42 22.3	334 41.3	49.1	298 16.6	41.5	20 08.5	10.4	65 30.1	08.8	Alpheratz	357 36.6	N29 12.9
	14	57 24.8	349 40.7	49.6	313 17.6	41.4	35 10.4	10.6	80 32.3	08.7	Altair	62 01.3	N 8 55.6
	15	72 27.3	4 40.0	50.2	328 18.6	41.2	50 12.3	10.8	95 34.6	08.6	Ankaa	353 09.0	S42 10.8
	16	87 29.7	19 39.4	50.7	343 19.7	41.1	65 14.2	11.0	110 36.8	08.5	Antares	112 17.3	S26 29.0
	17	102 32.2	34 38.8	51.3	358 20.7	40.9	80 16.1	11.3	125 39.1	08.5			
	18	117 34.7	49 38.2	N23 51.8	13 21.7	N24 40.8	95 18.0	N 8 11.5	140 41.4	S11 08.4	Arcturus	145 48.9	N19 03.6
	19	132 37.1	64 37.6	52.4	28 22.7	40.6	110 19.9	11.7	155 43.6	08.3	Atria	107 12.5	S69 04.0
	20	147 39.6	79 36.9	52.9	43 23.7	40.4	125 21.8	11.9	170 45.9	08.3	Avior	234 15.3	S59 35.3
	21	162 42.1	94 36.3	53.4	58 24.7	40.3	140 23.7	12.2	185 48.1	08.2	Bellatrix	278 24.6	N 6 22.2
	22	177 44.5	109 35.7	54.0	73 25.7	40.1	155 25.6	12.4	200 50.4	08.1	Betelgeuse	270 53.8	N 7 24.6
	23	192 47.0	124 35.1	54.5	88 26.7	40.0	170 27.5	12.6	215 52.7	08.0			
THURSDAY	00	207 49.5	139 34.4	N23 55.1	103 27.7	N24 39.8	185 29.4	N 8 12.8	230 54.9	S11 08.0	Canopus	263 53.3	S52 42.7
	01	222 51.9	154 33.8	55.6	118 28.7	39.7	200 31.3	13.0	245 57.2	07.9	Capella	280 24.4	N46 01.4
	02	237 54.4	169 33.2	56.1	133 29.7	39.5	215 33.2	13.3	260 59.4	07.8	Deneb	49 26.9	N45 21.4
	03	252 56.8	184 32.6	56.7	148 30.7	39.3	230 35.1	13.5	276 01.7	07.8	Denebola	182 26.2	N14 26.5
	04	267 59.3	199 32.0	57.2	163 31.7	39.2	245 37.0	13.7	291 03.9	07.7	Diphda	348 49.1	S17 51.7
	05	283 01.8	214 31.3	57.8	178 32.7	39.0	260 38.9	13.9	306 06.2	07.6			
	06	298 04.2	229 30.7	N23 58.3	193 33.7	N24 38.9	275 40.8	N 8 14.2	321 08.5	S11 07.5	Dubhe	193 42.3	N61 37.7
	07	313 06.7	244 30.1	58.8	208 34.7	38.7	290 42.7	14.4	336 10.7	07.5	Elnath	278 03.9	N28 37.6
	08	328 09.2	259 29.5	59.4	223 35.7	38.6	305 44.6	14.6	351 13.0	07.4	Eltanin	90 42.6	N51 28.8
	09	343 11.6	274 28.8	23 59.9	238 36.7	38.4	320 46.5	14.8	6 15.2	07.3	Enif	33 40.4	N 9 58.7
	10	358 14.1	289 28.2	24 00.4	253 37.8	38.2	335 48.4	15.0	21 17.5	07.3	Fomalhaut	15 16.4	S29 30.0
	11	13 16.6	304 27.6	00.9	268 38.8	38.1	350 50.3	15.3	36 19.8	07.2			
	12	28 19.0	319 27.0	N24 01.5	283 39.8	N24 37.9	5 52.2	N 8 15.5	51 22.0	S11 07.1	Gacrux	171 52.7	S57 14.7
	13	43 21.5	334 26.4	02.0	298 40.8	37.8	20 54.1	15.7	66 24.3	07.0	Gienah	175 44.8	S17 40.4
	14	58 23.9	349 25.7	02.5	313 41.8	37.6	35 56.0	15.9	81 26.5	07.0	Hadar	148 37.4	S60 29.1
	15	73 26.4	4 25.1	03.0	328 42.8	37.4	50 57.9	16.1	96 28.8	06.9	Hamal	327 53.2	N23 34.2
	16	88 28.9	19 24.5	03.6	343 43.8	37.3	65 59.8	16.4	111 31.1	06.8	Kaus Aust.	83 34.3	S34 22.4
	17	103 31.3	34 23.9	04.1	358 44.8	37.1	81 01.7	16.6	126 33.3	06.8			
	18	118 33.8	49 23.2	N24 04.6	13 45.8	N24 37.0	96 03.6	N 8 16.8	141 35.6	S11 06.7	Kochab	137 18.6	N74 03.5
	19	133 36.3	64 22.6	05.1	28 46.8	36.8	111 05.5	17.0	156 37.8	06.6	Markab	13 31.6	N15 19.6
	20	148 38.7	79 22.0	05.6	43 47.8	36.6	126 07.4	17.2	171 40.1	06.5	Menkar	314 08.0	N 4 10.7
	21	163 41.2	94 21.4	06.2	58 48.8	36.5	141 09.3	17.5	186 42.4	06.5	Menkent	147 58.9	S36 29.1
	22	178 43.7	109 20.7	06.7	73 49.8	36.3	156 11.2	17.7	201 44.6	06.4	Miaplacidus	221 38.3	S69 49.0
	23	193 46.1	124 20.1	07.2	88 50.8	36.2	171 13.1	17.9	216 46.9	06.3			
FRIDAY	00	208 48.6	139 19.5	N24 07.7	103 51.8	N24 36.0	186 15.0	N 8 18.1	231 49.1	S11 06.3	Mirfak	308 30.8	N49 56.6
	01	223 51.1	154 18.9	08.2	118 52.8	35.8	201 16.9	18.4	246 51.4	06.2	Nunki	75 49.4	S26 16.1
	02	238 53.5	169 18.2	08.7	133 53.8	35.7	216 18.8	18.6	261 53.7	06.1	Peacock	53 08.0	S56 39.4
	03	253 56.0	184 17.6	09.2	148 54.8	35.5	231 20.7	18.8	276 55.9	06.0	Pollux	243 19.1	N27 58.3
	04	268 58.4	199 17.0	09.8	163 55.8	35.3	246 22.6	19.0	291 58.2	06.0	Procyon	244 52.4	N 5 09.9
	05	284 00.9	214 16.3	10.3	178 56.8	35.2	261 24.5	19.2	307 00.5	05.9			
	06	299 03.4	229 15.7	N24 10.8	193 57.8	N24 35.0	276 26.4	N 8 19.5	322 02.7	S11 05.8	Rasalhague	95 59.7	N12 32.4
	07	314 05.8	244 15.1	11.3	208 58.8	34.9	291 28.3	19.7	337 05.0	05.8	Regulus	207 35.8	N11 51.2
	08	329 08.3	259 14.5	11.8	223 59.8	34.7	306 30.2	19.9	352 07.2	05.7	Rigel	281 05.5	S 8 10.6
	09	344 10.8	274 13.8	12.3	239 00.8	34.5	321 32.1	20.1	7 09.5	05.6	Rigel Kent.	139 41.7	S60 55.8
	10	359 13.2	289 13.2	12.8	254 01.8	34.4	336 34.0	20.3	22 11.8	05.6	Sabik	102 04.2	S15 45.3
	11	14 15.7	304 12.6	13.3	269 02.8	34.2	351 35.9	20.6	37 14.0	05.5			
	12	29 18.2	319 12.0	N24 13.8	284 03.8	N24 34.0	6 37.8	N 8 20.8	52 16.3	S11 05.4	Schedar	349 33.3	N56 39.7
	13	44 20.6	334 11.3	14.3	299 04.8	33.9	21 39.7	21.0	67 18.6	05.3	Shaula	96 12.1	S37 07.2
	14	59 23.1	349 10.7	14.8	314 05.8	33.7	36 41.6	21.2	82 20.8	05.3	Sirius	258 27.6	S16 45.0
	15	74 25.6	4 10.1	15.3	329 06.8	33.5	51 43.5	21.4	97 23.1	05.2	Spica	158 23.5	S11 17.0
	16	89 28.0	19 09.4	15.8	344 07.8	33.4	66 45.4	21.7	112 25.3	05.1	Suhail	222 47.3	S43 31.8
	17	104 30.5	34 08.8	16.3	359 08.8	33.2	81 47.3	21.9	127 27.6	05.1			
	18	119 32.9	49 08.2	N24 16.8	14 09.8	N24 33.0	96 49.2	N 8 22.1	142 29.9	S11 05.0	Vega	80 34.0	N38 48.0
	19	134 35.4	64 07.6	17.3	29 10.8	32.9	111 51.1	22.3	157 32.1	04.9	Zuben'ubi	136 57.3	S16 08.4
	20	149 37.9	79 06.9	17.8	44 11.8	32.7	126 53.0	22.5	172 34.4	04.9		SHA	Mer.Pass.
	21	164 40.3	94 06.3	18.3	59 12.8	32.5	141 54.9	22.8	187 36.7	04.8			
	22	179 42.8	109 05.7	18.7	74 13.8	32.4	156 56.8	23.0	202 38.9	04.7	Venus	291 45.0	h m
	23	194 45.3	124 05.0	19.2	89 14.8	32.2	171 58.7	23.2	217 41.2	04.6	Mars	255 38.3	17 05
Mer. Pass. 10 07.0		v -0.6 d 0.5		v 1.0 d 0.2		v 1.9 d 0.2		v 2.3 d 0.1		Saturn			23 05.5 8 35

UT	SUN			MOON					Lat.	Twilight		Sunrise	Moonrise												
	GHA	Dec		GHA	v	Dec	d	HP		Naut.	Civil		19	20	21	22									
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m									
1900	180	10.8	N11	00.5	193	43.0	12.2	N	3	36.5	16.4	59.0	N	72	////	01 01	03 11	04 16	03 35	02 30					
	01	195	11.0		01.3	208	14.2	12.2		3	52.9	16.4	58.9	N	70	////	02 00	03 32	04 22	03 52	03 10				
	02	210	11.1		02.2	222	45.4	12.1		4	09.3	16.3	58.9	68	////	02 33	03 49	04 27	04 06	03 38	02 44				
	03	225	11.3		03.1	237	16.5	12.2		4	25.6	16.4	58.9	66	00 53	02 57	04 02	04 31	04 17	03 59	03 33				
	04	240	11.4		03.9	251	47.7	12.2		4	42.0	16.2	58.9	64	01 44	03 15	04 13	04 35	04 26	04 17	04 04				
WEDNESDAY	05	255	11.5		04.8	266	18.9	12.2		4	58.2	16.3	58.9	62	02 14	03 30	04 22	04 38	04 35	04 31	04 27				
	06	270	11.7	N11	05.7	280	50.1	12.1	N	5	14.5	16.2	58.8	60	02 36	03 42	04 30	04 41	04 42	04 43	04 46				
	07	285	11.8		06.5	295	21.2	12.2		5	30.7	16.2	58.8	N	58	02 54	03 53	04 37	04 44	04 48	04 54	05 02			
	08	300	11.9		07.4	309	52.4	12.1		5	46.9	16.1	58.8	56	03 08	04 02	04 43	04 46	04 54	05 03	05 15				
	09	315	12.1		08.3	324	23.5	12.2		6	03.0	16.1	58.8	54	03 20	04 10	04 48	04 48	04 59	05 11	05 27				
	10	330	12.2		09.1	338	54.7	12.1		6	19.1	16.0	58.8	52	03 31	04 17	04 53	04 50	05 03	05 18	05 38				
	11	345	12.3		10.0	353	25.8	12.1		6	35.1	16.0	58.7	50	03 40	04 23	04 58	04 52	05 07	05 25	05 47				
	12		0 12.5	N11	10.9		7 56.9	12.1	N	6	51.1	16.0	58.7	45	03 59	04 36	05 07	04 56	05 16	05 39	06 07				
	13		15 12.6		11.7		22 28.0	12.1		N	40	04 13	04 47	05 15	N	40	04 13	04 47	05 15	04 59	05 24	05 51	06 23		
	14		30 12.7		12.6		36 59.1	12.1			35	04 25	04 56	05 22		35	04 25	04 56	05 22	05 02	05 30	06 02	06 36		
	15		45 12.9		13.5		51 30.2	12.0			30	04 34	05 04	05 28		30	04 34	05 04	05 28	05 04	05 36	06 11	06 48		
	16		60 13.0		14.3		66 01.2	12.1			20	04 49	05 16	05 38		20	04 49	05 16	05 38	05 08	05 46	06 26	07 09		
	17		75 13.1		15.2		80 32.3	12.0			N	10	05 01	05 26		N	10	05 01	05 26	05 47	05 12	05 55	06 40	07 27	
	18		90 13.3	N11	16.0		95 03.3	12.0	N	8	26.1	15.7	58.6	0	05 10	05 35	05 56	05 16	06 04	06 53	07 44				
	19		105 13.4		16.9		109 34.3	12.0			S	10	05 18	05 42		S	10	05 18	05 42	06 04	05 20	06 12	07 06	08 01	
	20		120 13.5		17.8		124 05.3	11.9			20	05 24	05 50	06 12		20	05 24	05 50	06 12	05 24	06 22	07 20	08 19	08 40	
	21		135 13.7		18.6		138 36.2	12.0			30	05 30	05 58	06 22		30	05 30	05 58	06 22	05 28	06 32	07 36	08 40		
	22		150 13.8		19.5		153 07.2	11.9			35	05 32	06 02	06 27		35	05 32	06 02	06 27	05 31	06 38	07 46	08 53		
	23		165 13.9		20.4		167 38.1	11.9	N	9	43.9	15.3	58.5	45	05 37	06 11	06 41	05 37	06 54	08 09	09 24				
	2000	180	14.1	N11	21.2	An annular-total eclipse of the Sun occurs on this date. See page 5.								S	50	05 39	06 16	06 49	05 42	07 04	08 25	09 46			
		01	195	14.2	22.1									S	52	05 39	06 19	06 53	05 44	07 08	08 33	09 56			
		02	210	14.3	22.9									S	54	05 40	06 21	06 58	05 46	07 13	08 41	10 08			
		03	225	14.5	23.8									S	56	05 41	06 24	07 03	05 48	07 19	08 50	10 21			
04		240	14.6	24.7	S									58	05 41	06 27	07 08	05 51	07 26	09 01	10 36				
THURSDAY	05	255	14.7	25.5	S	60	05 42	06 31	07 14	05 54	07 33	09 13	10 55												
	06	270	14.9	N11	26.4	269	13.9	11.7	N11	30.1	14.9	58.3													
	07	285	15.0		27.2	283	44.6	11.7		11	45.0	14.8	58.3												
	08	300	15.1		28.1	298	15.3	11.6		11	59.8	14.8	58.2												
	09	315	15.2		29.0	312	45.9	11.7		12	14.6	14.7	58.2												
	10	330	15.4		29.8	327	16.6	11.6		12	29.3	14.6	58.2												
	11	345	15.5		30.7	341	47.2	11.5		12	43.9	14.5	58.2												
	12		0 15.6	N11	31.5	356	17.7	11.6	N12	58.4	14.5	58.1													
	13		15 15.8		32.4		10 48.3	11.5		13	12.9	14.3	58.1	N	70	20 29	22 05	19 21	21 46						
	14		30 15.9		33.2		25 18.8	11.4		13	27.2	14.3	58.1	N	68	20 12	21 30	19 10	21 20	23 59					
	15		45 16.0		34.1		39 49.2	11.5		13	41.5	14.2	58.1	66	19 59	21 05	23 21	19 01	21 00	23 12					
	16		60 16.2		35.0		54 19.7	11.3		13	55.7	14.2	58.0	64	19 47	20 46	22 20	18 53	20 44	22 42	24 54				
	17		75 16.3		35.8		68 50.0	11.4		14	09.9	14.0	58.0	62	19 38	20 31	21 48	18 46	20 31	22 19	24 11				
	18		90 16.4	N11	36.7		83 20.4	11.3	N14	23.9	14.0	58.0		60	19 30	20 18	21 25	18 41	20 20	22 01	23 42				
	19		105 16.5		37.5		97 50.7	11.3		14	37.9	13.9	57.9	N	58	19 23	20 07	21 07	18 36	20 11	21 46	23 20			
	20		120 16.7		38.4		112 21.0	11.3		14	51.8	13.7	57.9	56	19 16	19 58	20 52	18 31	20 02	21 33	23 02				
	21		135 16.8		39.2		126 51.3	11.2		15	05.5	13.7	57.9	54	19 11	19 50	20 40	18 27	19 55	21 22	22 47				
	22		150 16.9		40.1		141 21.5	11.1		15	19.2	13.6	57.9	52	19 06	19 43	20 29	18 24	19 48	21 12	22 34				
	23		165 17.1		40.9		155 51.6	11.2		15	32.8	13.6	57.8	50	19 01	19 36	20 20	18 21	19 42	21 04	22 23				
	2100	180	17.2	N11	41.8	170	21.8	11.1	N15	46.4	13.4	57.8	N	40	18 43	19 12	19 46	18 08	19 19	20 30	21 40				
		01	195	17.3		42.6	184	51.9	11.0		15	59.8	13.3	57.8	35	18 36	19 03	19 34	18 03	19 11	20 18	21 24			
		02	210	17.4		43.5	199	21.9	11.0		16	13.1	13.2	57.7	30	18 30	18 55	19 24	17 59	19 03	20 07	21 11			
		03	225	17.6		44.4	213	51.9	11.0		16	26.3	13.2	57.7	20	18 20	18 42	19 09	17 51	18 49	19 48	20 47			
04		240	17.7		45.2	228	21.9	10.9		16	39.5	13.0	57.7	N	10	18 11	18 32	18 57	17 45	18 38	19 32	20 27			
FRIDAY	05	255	17.8		46.1	242	51.8	10.9		16	52.5	12.9	57.7	0	18 02	18 23	18 48	17 39	18 27	19 17	20 09				
	06	270	17.9	N11	46.9	257	21.7	10.9	N17	05.4	12.9	57.6	S	10	17 54	18 15	18 40	17 32	18 16	19 02	19 50				
	07	285	18.1		47.8	271	51.6	10.8		17	18.3	12.7	57.6	20	17 45	18 08	18 34	17 26	18 05	18 46	19 30				
	08	300	18.2		48.6	286	21.4	10.7		17	31.0	12.6	57.6	30	17 36	18 00	18 28	17 19	17 52	18 28	19 08				
	09	315	18.3		49.5	300	51.1	10.8		17	43.6	12.6	57.5	35	17 30	17 56	18 25	17 14	17 44	18 17	18 54				
	10	330	18.4		50.3	315	20.9	10.6		17	56.2	12.4	57.5	40	17 24	17 51	18 23	17 10	17 36	18 05	18 39				
	11	345	18.6		51.2	329	50.5	10.7		18	08.6	12.3	57.5	45	17 16	17 46	18 21	17 04	17 26	17 51	18 21				
	12		0 18.7	N11	52.0	344	20.2	10.6	N18	20.9	12.2	57.5	S	50	17 08	17 41	18 18	16 57	17 14	17 33	17 58				
	13		15 18.8		52.9	358	49.8	10.5		18	33.1	12.1	57.4	52	17 04	17 38	18 18	16 541							

UT	ARIES			VENUS −4.1			MARS +1.2			JUPITER −2.0			SATURN +0.9			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
SATURDAY	209 47.7	139 04.4 N24 19.7	104 15.8 N24 32.0	187 00.6 N 8 23.4	232 43.4 S11 04.6	Acamar	315 13.3 S40 12.8											
	224 50.2	154 03.8 20.2	119 16.8 31.9	202 02.5 23.6	247 45.7 04.5	Achernar	335 21.8 S57 07.2											
	239 52.7	169 03.2 20.7	134 17.8 31.7	217 04.4 23.9	262 48.0 04.4	Acrux	173 01.1 S63 13.8											
	254 55.1	184 02.5 . . 21.2	149 18.8 . . 31.5	232 06.3 . . 24.1	277 50.2 . . 04.4	Adhara	255 07.1 S29 00.4											
	269 57.6	199 01.9 21.7	164 19.8 31.4	247 08.2 24.3	292 52.5 04.3	Aldebaran	290 41.6 N16 33.3											
	285 00.0	214 01.3 22.1	179 20.8 31.2	262 10.1 24.5	307 54.8 04.2													
	300 02.5	229 00.6 N24 22.6	194 21.8 N24 31.0	277 12.0 N 8 24.7	322 57.0 S11 04.2	Alioth	166 13.7 N55 50.1											
	315 05.0	244 00.0 23.1	209 22.8 30.9	292 13.9 25.0	337 59.3 04.1	Alkaid	152 52.7 N49 11.8											
	330 07.4	258 59.4 23.6	224 23.8 30.7	307 15.8 25.2	353 01.6 04.0	Alnair	27 34.9 S46 50.8											
	345 09.9	273 58.8 . . 24.1	239 24.8 . . 30.5	322 17.7 . . 25.4	8 03.8 . . 03.9	Alnilam	275 39.4 S 1 11.3											
	0 12.4	288 58.1 24.5	254 25.8 30.3	337 19.6 25.6	23 06.1 03.9	Alphard	217 49.1 S 8 45.7											
	15 14.8	303 57.5 25.0	269 26.8 30.2	352 21.5 25.8	38 08.4 03.8													
	30 17.3	318 56.9 N24 25.5	284 27.8 N24 30.0	7 23.4 N 8 26.1	53 10.6 S11 03.7	Alphecca	126 04.6 N26 38.0											
	45 19.8	333 56.2 26.0	299 28.8 29.8	22 25.3 26.3	68 12.9 03.7	Alpheratz	357 36.6 N29 12.9											
	60 22.2	348 55.6 26.4	314 29.8 29.7	37 27.2 26.5	83 15.2 03.6	Altair	62 01.3 N 8 55.6											
	75 24.7	3 55.0 . . 26.9	329 30.8 . . 29.5	52 29.1 . . 26.7	98 17.4 . . 03.5	Ankaa	353 08.9 S42 10.8											
	90 27.2	18 54.3 27.4	344 31.8 29.3	67 31.0 26.9	113 19.7 03.5	Antares	112 17.3 S26 29.0											
	105 29.6	33 53.7 27.9	359 32.8 29.1	82 32.9 27.2	128 21.9 03.4													
	120 32.1	48 53.1 N24 28.3	14 33.8 N24 29.0	97 34.8 N 8 27.4	143 24.2 S11 03.3	Arcturus	145 48.9 N19 03.6											
	135 34.5	63 52.4 28.8	29 34.8 28.8	112 36.7 27.6	158 26.5 03.3	Atria	107 12.4 S69 04.0											
	150 37.0	78 51.8 29.3	44 35.8 28.6	127 38.6 27.8	173 28.7 03.2	Avior	234 15.3 S59 35.3											
	165 39.5	93 51.2 . . 29.7	59 36.8 . . 28.5	142 40.5 . . 28.0	188 31.0 . . 03.1	Bellatrix	278 24.7 N 6 22.2											
	180 41.9	108 50.5 30.2	74 37.8 28.3	157 42.4 28.3	203 33.3 03.1	Betelgeuse	270 53.8 N 7 24.6											
	195 44.4	123 49.9 30.6	89 38.8 28.1	172 44.3 28.5	218 35.5 03.0													
SUNDAY	210 46.9	138 49.3 N24 31.1	104 39.8 N24 27.9	187 46.2 N 8 28.7	233 37.8 S11 02.9	Canopus	263 53.3 S52 42.7											
	225 49.3	153 48.7 31.6	119 40.8 27.8	202 48.1 28.9	248 40.1 02.8	Capella	280 24.4 N46 01.3											
	240 51.8	168 48.0 32.0	134 41.8 27.6	217 50.0 29.1	263 42.3 02.8	Deneb	49 26.8 N45 21.4											
	255 54.3	183 47.4 . . 32.5	149 42.8 . . 27.4	232 51.9 . . 29.4	278 44.6 . . 02.7	Denebola	182 26.2 N14 26.5											
	270 56.7	198 46.8 32.9	164 43.8 27.2	247 53.8 29.6	293 46.9 02.6	Diphda	348 49.1 S17 51.7											
	285 59.2	213 46.1 33.4	179 44.8 27.1	262 55.7 29.8	308 49.1 02.6													
	301 01.7	228 45.5 N24 33.9	194 45.8 N24 26.9	277 57.6 N 8 30.0	323 51.4 S11 02.5	Dubhe	193 42.3 N61 37.7											
	316 04.1	243 44.9 34.3	209 46.8 26.7	292 59.5 30.2	338 53.7 02.4	Elnath	278 03.9 N28 37.6											
	331 06.6	258 44.2 34.8	224 47.8 26.5	308 01.4 30.5	353 55.9 02.4	Eltanin	90 42.6 N51 28.8											
	346 09.0	273 43.6 . . 35.2	239 48.8 . . 26.4	323 03.3 . . 30.7	8 58.2 . . 02.3	Enif	33 40.3 N 9 58.7											
	1 11.5	288 43.0 35.7	254 49.8 26.2	338 05.2 30.9	24 00.5 02.2	Fomalhaut	15 16.3 S29 30.0											
	16 14.0	303 42.3 36.1	269 50.8 26.0	353 07.1 31.1	39 02.8 02.2													
	31 16.4	318 41.7 N24 36.6	284 51.8 N24 25.8	8 09.0 N 8 31.3	54 05.0 S11 02.1	Gacrux	171 52.7 S57 14.7											
	46 18.9	333 41.1 37.0	299 52.8 25.7	23 10.9 31.6	69 07.3 02.0	Gienah	175 44.8 S17 40.4											
	61 21.4	348 40.4 37.5	314 53.8 25.5	38 12.8 31.8	84 09.6 02.0	Hadar	148 37.4 S60 29.1											
	76 23.8	3 39.8 . . 37.9	329 54.7 . . 25.3	53 14.7 . . 32.0	99 11.8 . . 01.9	Hamal	327 53.2 N23 34.2											
	91 26.3	18 39.2 38.3	344 55.7 25.1	68 16.6 32.2	114 14.1 01.8	Kaus Aust.	83 34.2 S34 22.4											
	106 28.8	33 38.5 38.8	359 56.7 25.0	83 18.5 32.4	129 16.4 01.8													
	121 31.2	48 37.9 N24 39.2	14 57.7 N24 24.8	98 20.4 N 8 32.7	144 18.6 S11 01.7	Kochab	137 18.6 N74 03.5											
	136 33.7	63 37.3 39.7	29 58.7 24.6	113 22.3 32.9	159 20.9 01.6	Markab	13 31.6 N15 19.6											
	151 36.2	78 36.6 40.1	44 59.7 24.4	128 24.2 33.1	174 23.2 01.6	Menkar	314 08.0 N 4 10.7											
	166 38.6	93 36.0 . . 40.6	60 00.7 . . 24.2	143 26.1 . . 33.3	189 25.4 . . 01.5	Menkent	147 58.9 S36 29.1											
	181 41.1	108 35.4 41.0	75 01.7 24.1	158 28.0 33.5	204 27.7 01.4	Miaplacidus	221 38.4 S69 49.0											
	196 43.5	123 34.7 41.4	90 02.7 23.9	173 29.9 33.8	219 30.0 01.3													
MONDAY	211 46.0	138 34.1 N24 41.9	105 03.7 N24 23.7	188 31.8 N 8 34.0	234 32.2 S11 01.3	Mirfak	308 30.8 N49 56.6											
	226 48.5	153 33.5 42.3	120 04.7 23.5	203 33.7 . 34.2	249 34.5 01.2	Nunki	75 49.4 S26 16.1											
	241 50.9	168 32.8 42.7	135 05.7 23.4	218 35.6 34.4	264 36.8 01.1	Peacock	53 08.0 S56 39.4											
	256 53.4	183 32.2 . . 43.2	150 06.7 . . 23.2	233 37.5 . . 34.6	279 39.1 . . 01.1	Pollux	243 19.1 N27 58.3											
	271 55.9	198 31.6 43.6	165 07.7 23.0	248 39.4 34.8	294 41.3 01.0	Procyon	244 52.4 N 5 09.9											
	286 58.3	213 30.9 44.0	180 08.7 22.8	263 41.3 35.1	309 43.6 00.9													
	302 00.8	228 30.3 N24 44.4	195 09.7 N24 22.6	278 43.2 N 8 35.3	324 45.9 S11 00.9	Rasalhague	95 59.7 N12 32.4											
	317 03.3	243 29.7 44.9	210 10.7 22.5	293 45.1 35.5	339 48.1 00.8	Regulus	207 35.8 N11 51.2											
	332 05.7	258 29.0 45.3	225 11.7 22.3	308 47.0 35.7	354 50.4 00.7	Rigel	281 05.5 S 8 10.6											
	347 08.2	273 28.4 . . 45.7	240 12.7 . . 22.1	323 48.9 . . 35.9	9 52.7 . . 00.7	Rigel Kent.	139 41.7 S60 55.8											
	2 10.6	288 27.8 46.2	255 13.7 21.9	338 50.8 36.2	24 54.9 00.6	Sabik	102 04.2 S15 45.3											
	17 13.1	303 27.1 46.6	270 14.6 21.7	353 52.7 36.4	39 57.2 00.5													
	32 15.6	318 26.5 N24 47.0	285 15.6 N24 21.5	8 54.6 N 8 36.6	54 59.5 S11 00.5	Schedar	349 33.2 N56 39.7											
	47 18.0	333 25.9 47.4	300 16.6 21.4	23 56.5 36.8	70 01.8 00.4	Shaula	96 12.1 S37 07.2											
	62 20.5	348 25.2 47.8	315 17.6 21.2	38 58.4 37.0	85 04.0 00.3	Sirius	258 27.7 S16 45.0											
	77 23.0	3 24.6 . . 48.3	330 18.6 . . 21.0	54 00.3 . . 37.3	100 06.3 . . 00.3	Spica	158 23.5 S11 17.0											
	92 25.4	18 23.9 48.7	345 19.6 20.8	69 02.2 37.5	115 08.6 00.2	Suhail	222 47.3 S43 31.8											
	107 27.9	33 23.3 49.1	0 20.6 20.6	84 04.1 37.7	130 10.8 00.1													
	122 30.4	48 22.7 N24 49.5	15 21.6 N24 20.5	99 06.0 N 8 37.9	145 13.1 S11 00.1	Vega	80 34.0 N38 48.0											
	137 32.8	63 22.0 49.9	30 22.6 20.3	114 07.9 38.1	160 15.4 11 00.0	Zuben'ubi	136 57.3 S16 08.4											
	152 35.3	78 21.4 50.3	45 23.6 20.1	129 09.8 38.3	175 17.7 10 59.9													
	167 37.8	93 20.8 . . 50.7	60 24.6 . . 19.9	144 11.7 . . 38.6	190 19.9 . . 59.9													
	182 40.2	108 20.1 51.2	75 25.6 19.7	159 13.6 38.8	205 22.2 59.8													
	197 42.7	123 19.5 51.6	90 26.6 19.5	174 15.5 39.0	220 24.5 59.7													
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UT	ARIES			VENUS -4.1			MARS +1.3			JUPITER -2.0			SATURN +0.9			STARS		
	GHA	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		Name	SHA	Dec
TUESDAY	25 00	212 45.1	138 18.9	N24 52.0	105 27.6	N24 19.4	189 17.4	N 8 39.2		235 26.7	S10 59.7		Acamar	315 13.3	S40 12.8			
	01	227 47.6	153 18.2	52.4	120 28.6	19.2	204 19.3	39.4		250 29.0	59.6		Achernar	335 21.8	S57 07.1			
	02	242 50.1	168 17.6	52.8	135 29.5	19.0	219 21.2	39.7		265 31.3	59.5		Acrux	173 01.1	S63 13.8			
	03	257 52.5	183 17.0	.. 53.2	150 30.5	.. 18.8	234 23.1	.. 39.9		280 33.6	.. 59.5		Adhara	255 07.1	S29 00.4			
	04	272 55.0	198 16.3	53.6	165 31.5	18.6	249 25.0	40.1		295 35.8	59.4		Aldebaran	290 41.6	N16 33.3			
	05	287 57.5	213 15.7	54.0	180 32.5	18.4	264 26.9	40.3		310 38.1	59.3							
	06	302 59.9	228 15.1	N24 54.4	195 33.5	N24 18.2	279 28.8	N 8 40.5		325 40.4	S10 59.3		Alioth	166 13.7	N55 50.1			
	07	318 02.4	243 14.4	54.8	210 34.5	18.1	294 30.7	40.7		340 42.6	59.2		Alkaid	152 52.6	N49 11.8			
	08	333 04.9	258 13.8	55.2	225 35.5	17.9	309 32.6	41.0		355 44.9	59.1		Alnair	27 34.9	S46 50.8			
	09	348 07.3	273 13.1	.. 55.6	240 36.5	.. 17.7	324 34.5	.. 41.2		10 47.2	.. 59.1		Alnilam	275 39.4	S 1 11.3			
	10	3 09.8	288 12.5	56.0	255 37.5	17.5	339 36.4	41.4		25 49.5	59.0		Alphard	217 49.1	S 8 45.7			
	11	18 12.3	303 11.9	56.4	270 38.5	17.3	354 38.3	41.6		40 51.7	58.9							
	12	33 14.7	318 11.2	N24 56.8	285 39.5	N24 17.1	9 40.2	N 8 41.8		55 54.0	S10 58.9		Alphecca	126 04.6	N26 38.0			
	13	48 17.2	333 10.6	57.2	300 40.5	16.9	24 42.1	42.1		70 56.3	58.8		Alpheratz	357 36.6	N29 12.9			
	14	63 19.6	348 10.0	57.6	315 41.5	16.7	39 44.0	42.3		85 58.6	58.7		Altair	62 01.3	N 8 55.6			
	15	78 22.1	3 09.3	.. 58.0	330 42.4	.. 16.6	54 45.9	.. 42.5		101 00.8	.. 58.7		Ankaa	353 08.9	S42 10.8			
	16	93 24.6	18 08.7	58.4	345 43.4	16.4	69 47.8	42.7		116 03.1	58.6		Antares	112 17.3	S26 29.0			
	17	108 27.0	33 08.1	58.7	0 44.4	16.2	84 49.7	42.9		131 05.4	58.6							
	18	123 29.5	48 07.4	N24 59.1	15 45.4	N24 16.0	99 51.6	N 8 43.1		146 07.7	S10 58.5		Arcturus	145 48.9	N19 03.6			
	19	138 32.0	63 06.8	59.5	30 46.4	15.8	114 53.5	43.4		161 09.9	58.4		Atria	107 12.4	S69 04.0			
	20	153 34.4	78 06.2	24 59.9	45 47.4	15.6	129 55.4	43.6		176 12.2	58.4		Avior	234 15.4	S59 35.3			
	21	168 36.9	93 05.5	25 00.3	60 48.4	.. 15.4	144 57.3	.. 43.8		191 14.5	.. 58.3		Bellatrix	278 24.7	N 6 22.2			
	22	183 39.4	108 04.9	00.7	75 49.4	15.2	159 59.2	44.0		206 16.8	58.2		Betelgeuse	270 53.8	N 7 24.6			
	23	198 41.8	123 04.2	01.1	90 50.4	15.0	175 01.1	44.2		221 19.0	58.2							
WEDNESDAY	26 00	213 44.3	138 03.6	N25 01.4	105 51.4	N24 14.9	190 03.0	N 8 44.4		236 21.3	S10 58.1		Canopus	263 53.3	S52 42.7			
	01	228 46.8	153 03.0	01.8	120 52.4	14.7	205 04.9	44.7		251 23.6	58.0		Capella	280 24.4	N46 01.3			
	02	243 49.2	168 02.3	02.2	135 53.3	14.5	220 06.8	44.9		266 25.9	58.0		Deneb	49 26.8	N45 21.4			
	03	258 51.7	183 01.7	.. 02.6	150 54.3	.. 14.3	235 08.7	.. 45.1		281 28.1	.. 57.9		Denebola	182 26.2	N14 26.5			
	04	273 54.1	198 01.1	03.0	165 55.3	14.1	250 10.6	45.3		296 30.4	57.8		Diphda	348 49.0	S17 51.6			
	05	288 56.6	213 00.4	03.3	180 56.3	13.9	265 12.5	45.5		311 32.7	57.8							
	06	303 59.1	227 59.8	N25 03.7	195 57.3	N24 13.7	280 14.4	N 8 45.8		326 35.0	S10 57.7		Dubhe	193 42.3	N61 37.8			
	07	319 01.5	242 59.2	04.1	210 58.3	13.5	295 16.3	46.0		341 37.2	57.6		Elnath	278 03.9	N28 37.6			
	08	334 04.0	257 58.5	04.5	225 59.3	13.3	310 18.2	46.2		356 39.5	57.6		Eltanin	90 42.5	N51 28.8			
	09	349 06.5	272 57.9	.. 04.8	241 00.3	.. 13.1	325 20.1	.. 46.4		11 41.8	.. 57.5		Enif	33 40.3	N 9 58.7			
	10	4 08.9	287 57.2	05.2	256 01.3	12.9	340 22.0	46.6		26 44.1	57.4		Fomalhaut	15 16.3	S29 30.0			
	11	19 11.4	302 56.6	05.6	271 02.3	12.7	355 23.9	46.8		41 46.3	57.4							
	12	34 13.9	317 56.0	N25 05.9	286 03.3	N24 12.6	10 25.8	N 8 47.1		56 48.6	S10 57.3		Gacrux	171 52.7	S57 14.8			
	13	49 16.3	332 55.3	06.3	301 04.2	12.4	25 27.7	47.3		71 50.9	57.2		Gienah	175 44.8	S17 40.4			
	14	64 18.8	347 54.7	06.7	316 05.2	12.2	40 29.6	47.5		86 53.2	57.2		Hadar	148 37.4	S60 29.1			
	15	79 21.2	2 54.1	.. 07.0	331 06.2	.. 12.0	55 31.5	.. 47.7		101 55.4	.. 57.1		Hamal	327 53.2	N23 34.2			
	16	94 23.7	17 53.4	07.4	346 07.2	11.8	70 33.4	47.9		116 57.7	57.1		Kaus Aust.	83 34.2	S34 22.3			
	17	109 26.2	32 52.8	07.8	1 08.2	11.6	85 35.3	48.1		132 00.0	57.0							
	18	124 28.6	47 52.2	N25 08.1	16 09.2	N24 11.4	100 37.2	N 8 48.4		147 02.3	S10 56.9		Kochab	137 18.6	N74 03.5			
	19	139 31.1	62 51.5	08.5	31 10.2	11.2	115 39.1	48.6		162 04.6	56.9		Markab	13 31.5	N15 19.6			
	20	154 33.6	77 50.9	08.8	46 11.2	11.0	130 41.0	48.8		177 06.8	56.8		Menkar	314 08.0	N 4 10.7			
	21	169 36.0	92 50.2	.. 09.2	61 12.2	.. 10.8	145 42.9	.. 49.0		192 09.1	.. 56.7		Menkent	147 58.9	S36 29.1			
	22	184 38.5	107 49.6	09.6	76 13.1	10.6	160 44.8	49.2		207 11.4	56.7		Miaplacidus	221 38.4	S69 49.0			
	23	199 41.0	122 49.0	09.9	91 14.1	10.4	175 46.7	49.4		222 13.7	56.6							
THURSDAY	27 00	214 43.4	137 48.3	N25 10.3	106 15.1	N24 10.2	190 48.6	N 8 49.7		237 15.9	S10 56.5		Mirfak	308 30.8	N49 56.6			
	01	229 45.9	152 47.7	10.6	121 16.1	10.0	205 50.5	.. 49.9		252 18.2	56.5		Nunki	75 49.4	S26 16.0			
	02	244 48.4	167 47.1	11.0	136 17.1	09.8	220 52.4	50.1		267 20.5	56.4		Peacock	53 08.0	S56 39.4			
	03	259 50.8	182 46.4	.. 11.3	151 18.1	.. 09.6	235 54.3	.. 50.3		282 22.8	.. 56.3		Pollux	243 19.1	N27 58.3			
	04	274 53.3	197 45.8	11.7	166 19.1	09.4	250 56.2	50.5		297 25.1	56.3		Procyon	244 52.4	N 5 09.9			
	05	289 55.7	212 45.2	12.0	181 20.1	09.2	265 58.1	50.7		312 27.3	56.2							
	06	304 58.2	227 44.5	N25 12.4	196 21.1	N24 09.0	281 00.0	N 8 51.0		327 29.6	S10 56.2		Rasalhague	95 59.7	N12 32.4			
	07	320 00.7	242 43.9	12.7	211 22.0	08.8	296 01.9	51.2		342 31.9	56.1		Regulus	207 35.8	N11 51.2			
	08	335 03.1	257 43.2	13.1	226 23.0	08.6	311 03.8	51.4		357 34.2	56.0		Rigel	281 05.5	S 8 10.6			
	09	350 05.6	272 42.6	.. 13.4	241 24.0	.. 08.4	326 05.7	.. 51.6		12 36.4	.. 56.0		Rigel Kent.	139 41.6	S60 55.9			
	10	5 08.1	287 42.0	13.7	256 25.0	08.3	341 07.6	51.8		27 38.7	55.9		Sabik	102 04.2	S15 45.3			
	11	20 10.5	302 41.3	14.1	271 26.0	08.1	356 09.5	52.0		42 41.0	55.8							
	12	35 13.0	317 40.7	N25 14.4	286 27.0	N24 07.9	11 11.4	N 8 52.3		57 43.3	S10 55.8		Schedar	349 33.2	N56 39.7			
	13	50 15.5	332 40.1	14.8	301 28.0	07.7	26 13.3	52.5		72 45.6	55.7		Shaula	96 12.0	S37 07.2			
	14	65 17.9	347 39.4	15.1	316 29.0	07.5	41 15.3	52.7		87 47.8	55.6		Sirius	258 27.7	S16 45.0			
	15	80 20.4	2 38.8	.. 15.4	331 29.9	.. 07.3	56 17.2	.. 52.9		102 50.1	.. 55.6		Spica	158 23.5	S11 17.0			
	16	95 22.9	17 38.2	.. 15.8	346 30.9	07.1	71 19.1	53.1		117 52.4	55.5		Suhail	222 47.3	S43 31.8			
	17	110 25.3	32 37.5	16.1	1 31.9	06.9	86 21.0	53.3		132 54 5								

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
										25	26		27	28			
	GHA	Dec	GHA	v	Dec	d	HP	Naut.							Civil	h m	h m
TUESDAY	d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	N 72	h m	h m	h m	h m	h m	h m	h m	h m
	25 00	180 28.5	N13 02.1	119 50.5	8.8	N27 55.2	0.8	55.1	N 70	00 57	03 01	02 32	03 01	03 22	03 38	03 52	04 03
	01	195 28.7	02.9	134 18.3	8.8	27 56.0	0.6	55.1	68	01 53	03 22	03 01	03 22	03 38	03 52	04 03	04 13
	02	210 28.8	03.8	148 46.1	8.9	27 56.6	0.5	55.1	66	02 26	03 38	03 01	03 22	03 38	03 52	04 03	04 13
	03	225 28.9	04.6	163 14.0	8.8	27 57.1	0.4	55.1	64	02 49	03 52	03 01	03 22	03 38	03 52	04 03	04 13
	04	240 29.0	05.4	177 41.8	8.9	27 57.5	0.2	55.1	62	03 07	04 03	03 01	03 22	03 38	03 52	04 03	04 13
	05	255 29.1	06.2	192 09.7	8.9	27 57.7	0.0	55.0	60	03 22	04 13	03 01	03 22	03 38	03 52	04 03	04 13
	06	270 29.2	N13 07.0	206 37.6	8.9	N27 57.7	0.1	55.0	N 58	03 35	04 21	03 01	03 22	03 38	03 52	04 03	04 13
	07	285 29.3	07.8	221 05.5	9.0	27 57.6	0.2	55.0	56	03 46	04 28	03 01	03 22	03 38	03 52	04 03	04 13
	08	300 29.4	08.7	235 33.5	9.0	27 57.4	0.4	55.0	54	03 55	04 35	03 01	03 22	03 38	03 52	04 03	04 13
	09	315 29.5	09.5	250 01.5	9.0	27 57.0	0.5	55.0	52	04 03	04 41	03 01	03 22	03 38	03 52	04 03	04 13
	10	330 29.6	10.3	264 29.5	9.1	27 56.5	0.6	54.9	50	04 11	04 46	03 01	03 22	03 38	03 52	04 03	04 13
	11	345 29.7	11.1	278 57.6	9.1	27 55.9	0.8	54.9	45	04 26	04 58	03 01	03 22	03 38	03 52	04 03	04 13
	12	0 29.8	N13 11.9	293 25.7	9.1	N27 55.1	1.0	54.9	N 40	04 38	05 07	03 01	03 22	03 38	03 52	04 03	04 13
	13	15 30.0	12.7	307 53.8	9.2	27 54.1	1.1	54.9	35	04 48	05 15	03 01	03 22	03 38	03 52	04 03	04 13
	14	30 30.1	13.6	322 22.0	9.2	27 53.0	1.2	54.9	30	04 57	05 22	03 01	03 22	03 38	03 52	04 03	04 13
	15	45 30.2	14.4	336 50.2	9.2	27 51.8	1.4	54.8	20	05 05	05 31	03 01	03 22	03 38	03 52	04 03	04 13
	16	60 30.3	15.2	351 18.4	9.3	27 50.4	1.5	54.8	N 10	05 15	05 41	03 01	03 22	03 38	03 52	04 03	04 13
	17	75 30.4	16.0	5 46.7	9.4	27 48.9	1.6	54.8	0	05 26	05 53	03 01	03 22	03 38	03 52	04 03	04 13
	18	90 30.5	N13 16.8	20 15.1	9.3	N27 47.3	1.8	54.8	S 10	05 36	06 02	03 01	03 22	03 38	03 52	04 03	04 13
	19	105 30.6	17.6	34 43.4	9.4	27 45.5	1.9	54.8	20	05 46	06 12	03 01	03 22	03 38	03 52	04 03	04 13
	20	120 30.7	18.4	49 11.8	9.5	27 43.6	2.1	54.7	30	05 56	06 22	03 01	03 22	03 38	03 52	04 03	04 13
	21	135 30.8	19.2	63 40.3	9.5	27 41.5	2.2	54.7	35	06 06	06 32	03 01	03 22	03 38	03 52	04 03	04 13
	22	150 30.9	20.1	78 08.8	9.5	27 39.3	2.3	54.7	40	06 16	06 42	03 01	03 22	03 38	03 52	04 03	04 13
	23	165 31.0	20.9	92 37.3	9.6	27 37.0	2.5	54.7	45	06 26	06 52	03 01	03 22	03 38	03 52	04 03	04 13
WEDNESDAY	26 00	180 31.1	N13 21.7	107 05.9	9.7	N27 34.5	2.6	54.7	S 50	06 32	06 58	03 01	03 22	03 38	03 52	04 03	04 13
	01	195 31.2	22.5	121 34.6	9.7	27 31.9	2.7	54.7	52	06 42	07 08	03 01	03 22	03 38	03 52	04 03	04 13
	02	210 31.3	23.3	136 03.3	9.7	27 29.2	2.9	54.7	54	06 52	07 18	03 01	03 22	03 38	03 52	04 03	04 13
	03	225 31.4	24.1	150 32.0	9.8	27 26.3	3.0	54.6	56	07 02	07 28	03 01	03 22	03 38	03 52	04 03	04 13
	04	240 31.5	24.9	165 00.8	9.8	27 23.3	3.1	54.6	58	07 12	07 38	03 01	03 22	03 38	03 52	04 03	04 13
	05	255 31.6	25.7	179 29.6	9.9	27 20.2	3.3	54.6	S 60	07 22	07 48	03 01	03 22	03 38	03 52	04 03	04 13
	06	270 31.7	N13 26.5	193 58.5	10.0	N27 16.9	3.4	54.6									
	07	285 31.8	27.3	208 27.5	10.0	27 13.5	3.5	54.6	Lat.	Sunset							
	08	300 31.9	28.1	222 56.5	10.0	27 10.0	3.6	54.6			Civil	Naut.					
	09	315 32.0	29.0	237 25.5	10.1	27 06.4	3.8	54.5									
	10	330 32.1	29.8	251 54.6	10.2	27 02.6	4.0	54.5									
	11	345 32.2	30.6	266 23.8	10.2	26 58.6	4.0	54.5	N 72	21 29	23 15	23 15	03 43	04 04	04 03	04 00	04 00
	12	0 32.3	N13 31.4	280 53.0	10.3	N26 54.6	4.2	54.5	N 70	20 59	23 15	23 15	03 43	04 04	04 03	04 00	04 00
	13	15 32.4	32.2	295 22.3	10.3	26 50.4	4.3	54.5	68	20 37	22 09	23 15	03 43	04 04	04 03	04 00	04 00
	14	30 32.5	33.0	309 51.6	10.4	26 46.1	4.4	54.5	66	20 20	21 34	23 15	03 43	04 04	04 03	04 00	04 00
	15	45 32.6	33.8	324 21.0	10.5	26 41.7	4.6	54.5	64	20 06	21 10	23 21	03 43	04 04	04 03	04 00	04 00
	16	60 32.7	34.6	338 50.5	10.5	26 37.1	4.6	54.5	62	19 55	20 51	23 21	03 43	04 04	04 03	04 00	04 00
	17	75 32.8	35.4	353 20.0	10.6	26 32.5	4.8	54.5	60	19 45	20 36	21 50	03 43	04 04	04 03	04 00	04 00
	18	90 32.9	N13 36.2	7 49.6	10.6	N26 27.7	5.0	54.4	N 58	19 36	20 23	21 27	03 43	04 04	04 03	04 00	04 00
	19	105 33.0	37.0	22 19.2	10.7	26 22.7	5.0	54.4	56	19 29	20 12	21 10	03 43	04 04	04 03	04 00	04 00
	20	120 33.1	37.8	36 48.9	10.8	26 17.7	5.2	54.4	54	19 22	20 02	20 55	03 43	04 04	04 03	04 00	04 00
	21	135 33.2	38.6	51 18.7	10.8	26 12.5	5.3	54.4	52	19 16	19 54	20 42	03 43	04 04	04 03	04 00	04 00
	22	150 33.3	39.4	65 48.5	10.9	26 07.2	5.4	54.4	50	19 11	19 46	20 32	03 43	04 04	04 03	04 00	04 00
	23	165 33.4	40.2	80 18.4	10.9	26 01.8	5.5	54.4	45	18 59	19 31	20 10	03 43	04 04	04 03	04 00	04 00
	THURSDAY	27 00	180 33.5	N13 41.0	94 48.3	11.0	N25 56.3	5.6	54.4	N 40	18 49	19 18	19 53	24 36	00 36	01 19	01 54
01		195 33.6	41.8	109 18.3	11.1	25 50.7	5.8	54.4	35	18 41	19 08	19 40	24 17	00 17	01 02	01 39	02 14
02		210 33.7	42.6	123 48.4	11.1	25 44.9	5.9	54.4	30	18 34	18 59	19 29	24 01	00 01	00 47	01 26	02 01
03		225 33.8	43.4	138 18.5	11.2	25 39.0	6.0	54.4	20	18 22	18 45	19 11	23 34	24 22	00 22	01 05	01 40
04		240 33.9	44.2	152 48.7	11.3	25 33.0	6.1	54.3	N 10	18 11	18 33	18 58	23 11	24 00	00 00	00 46	01 21
05		255 34.0	45.0	167 19.0	11.3	25 26.9	6.2	54.3	0	18 01	18 23	18 47	22 49	23 40	24 28	00 28	01 03
06		270 34.1	N13 45.8	181 49.3	11.4	N25 20.7	6.4	54.3	S 10	17 52	18 13	18 38	22 27	23 19	24 10	00 10	00 43
07		285 34.2	46.6	196 19.7	11.5	25 14.3	6.4	54.3	20	17 41	18 04	18 30	22 03	22 57	23 51	00 13	00 46
08		300 34.3	47.4	210 50.2	11.5	25 07.9	6.6	54.3	30	17 30	17 54	18 22	21 36	22 32	23 29	00 16	00 49
09		315 34.4	48.2	225 20.7	11.6	25 01.3	6.7	54.3	35	17 23	17 49	18 19	21 19	22 17	23 16	00 19	00 52
10		330 34.5	49.0	239 51.3	11.7	24 54.6	6.8	54.3	40	17 16	17 43	18 15	21 00	21 59	23 00	00 24	00 57
11		345 34.6	49.8	254 22.0	11.7	24 47.8	6.9	54.3	45	17 07	17 37	18 12	20 37	21 38	22 42	00 28	00 61
12		0 34.7	N13 50.6	268 52.7	11.8	N24 40.9	7.0	54.3	S 50	16 56	17 30	18 08	20 07	21 11	22 20	00 30	00 64
13		15 34.8	51.4	283 23.5	11.8	24 33.9	7.1	54.3	52	16 52	17 27	18 06	19 53	20 58	22 09	00 33	00 67
14		30 34.9	52.2	297 54.3	11.9	24 26.8	7.2	54.3	54	16 46	17 23	18 05	19 36	20 42	21 56	00 36	00 69
15		45 35.0	53.0	312 25.2	12.0	24 19.6	7.3	54.3	56	16 40	17 20	18 03	19 15	20 24	21 42	00 39	00 72
16		60 35.1	53.8	326 56.2	12.1	24 12.3	7.5	54.3	58	16 34	17 15	18 02	18 50	20 03	21 25	00 42	00 75
17		75 35.2	54.6	341 27.3	12.1	24 04.8	7.5	54.3	S 60	16 26	17 11	18 00	18 14	19 34	21 05	00 45	00 78
18																	

UT	ARIES		VENUS −4.1		MARS +1.3		JUPITER −2.1		SATURN +0.9		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
28 F R I D A Y	00	215 42.6	137 33.1	N25 18.4	106 38.8	N24 05.5	191 34.3	N 8 54.9	238 10.6	S10 55.0	Acamar	315 13.3	S40 12.8
	01	230 45.0	152 32.4	18.8	121 39.8	05.3	206 36.2	55.1	253 12.9	55.0	Achernar	335 21.8	S57 07.1
	02	245 47.5	167 31.8	19.1	136 40.8	05.1	221 38.1	55.3	268 15.2	54.9	Acrux	173 01.1	S63 13.8
	03	260 50.0	182 31.2	19.4	151 41.8	04.8	236 40.0	55.5	283 17.5	54.8	Adhara	255 07.2	S29 00.4
	04	275 52.4	197 30.5	19.7	166 42.8	04.6	251 41.9	55.7	298 19.8	54.8	Aldebaran	290 41.6	N16 33.3
	05	290 54.9	212 29.9	20.1	181 43.8	04.4	266 43.8	55.9	313 22.0	54.7			
	06	305 57.4	227 29.3	N25 20.4	196 44.8	N24 04.2	281 45.7	N 8 56.1	328 24.3	S10 54.6	Alioth	166 13.7	N55 50.1
	07	320 59.8	242 28.6	20.7	211 45.7	04.0	296 47.6	56.4	343 26.6	54.6	Alkaid	152 52.6	N49 11.8
	08	336 02.3	257 28.0	21.0	226 46.7	03.8	311 49.5	56.6	358 28.9	54.5	Alnair	27 34.9	S46 50.8
	09	351 04.7	272 27.4	21.3	241 47.7	03.6	326 51.4	56.8	13 31.2	54.5	Alnilam	275 39.4	S 1 11.3
	10	6 07.2	287 26.7	21.6	256 48.7	03.4	341 53.3	57.0	28 33.5	54.4	Alphard	217 49.1	S 8 45.7
	11	21 09.7	302 26.1	22.0	271 49.7	03.2	356 55.2	57.2	43 35.7	54.3			
	12	36 12.1	317 25.5	N25 22.3	286 50.7	N24 03.0	11 57.1	N 8 57.4	58 38.0	S10 54.3	Alphecca	126 04.6	N26 38.1
	13	51 14.6	332 24.8	22.6	301 51.7	02.8	26 59.0	57.7	73 40.3	54.2	Alpheratz	357 36.5	N29 12.9
	14	66 17.1	347 24.2	22.9	316 52.6	02.6	42 00.9	57.9	88 42.6	54.1	Altair	62 01.3	N 8 55.6
	15	81 19.5	2 23.5	23.2	331 53.6	02.4	57 02.8	58.1	103 44.9	54.1	Ankaa	353 08.9	S42 10.8
	16	96 22.0	17 22.9	23.5	346 54.6	02.2	72 04.7	58.3	118 47.2	54.0	Antares	112 17.3	S26 29.0
	17	111 24.5	32 22.3	23.8	1 55.6	02.0	87 06.6	58.5	133 49.4	54.0			
	18	126 26.9	47 21.6	N25 24.1	16 56.6	N24 01.8	102 08.5	N 8 58.7	148 51.7	S10 53.9	Arcturus	145 48.9	N19 03.6
	19	141 29.4	62 21.0	24.4	31 57.6	01.6	117 10.4	59.0	163 54.0	53.8	Atria	107 12.3	S69 04.0
	20	156 31.8	77 20.4	24.7	46 58.6	01.4	132 12.3	59.2	178 56.3	53.8	Avior	234 15.4	S59 35.3
	21	171 34.3	92 19.7	25.1	61 59.5	01.2	147 14.2	59.4	193 58.6	53.7	Bellatrix	278 24.7	N 6 22.2
	22	186 36.8	107 19.1	25.4	77 00.5	01.0	162 16.1	59.6	209 00.9	53.6	Betelgeuse	270 53.9	N 7 24.6
	23	201 39.2	122 18.5	25.7	92 01.5	00.8	177 18.0	8 59.8	224 03.1	53.6			
	29 S A T U R D A Y	00	216 41.7	137 17.8	N25 26.0	107 02.5	N24 00.6	192 19.9	N 9 00.0	239 05.4	S10 53.5	Canopus	263 53.3
01		231 44.2	152 17.2	26.3	122 03.5	00.3	207 21.8	00.2	254 07.7	53.5	Capella	280 24.4	N46 01.3
02		246 46.6	167 16.6	26.6	137 04.5	24 00.1	222 23.7	00.5	269 10.0	53.4	Deneb	49 26.8	N45 21.4
03		261 49.1	182 15.9	26.8	152 05.5	23 59.9	237 25.6	00.7	284 12.3	53.3	Denebola	182 26.2	N14 26.5
04		276 51.6	197 15.3	27.1	167 06.4	59.7	252 27.5	00.9	299 14.6	53.3	Diphda	348 49.0	S17 51.6
05		291 54.0	212 14.7	27.4	182 07.4	59.5	267 29.4	01.1	314 16.8	53.2			
06		306 56.5	227 14.0	N25 27.7	197 08.4	N23 59.3	282 31.3	N 9 01.3	329 19.1	S10 53.1	Dubhe	193 42.4	N61 37.8
07		321 59.0	242 13.4	28.0	212 09.4	59.1	297 33.2	01.5	344 21.4	53.1	El Nath	278 04.0	N28 37.6
08		337 01.4	257 12.8	28.3	227 10.4	58.9	312 35.1	01.7	359 23.7	53.0	Eltanin	90 42.5	N51 28.8
09		352 03.9	272 12.1	28.6	242 11.4	58.7	327 37.0	02.0	14 26.0	53.0	Enif	33 40.3	N 9 58.7
10		7 06.3	287 11.5	28.9	257 12.4	58.5	342 38.9	02.2	29 28.3	52.9	Fomalhaut	15 16.3	S29 29.9
11		22 08.8	302 10.9	29.2	272 13.3	58.3	357 40.9	02.4	44 30.5	52.8			
12		37 11.3	317 10.2	N25 29.5	287 14.3	N23 58.0	12 42.8	N 9 02.6	59 32.8	S10 52.8	Gacrux	171 52.8	S57 14.8
13		52 13.7	332 09.6	29.8	302 15.3	57.8	27 44.7	02.8	74 35.1	52.7	Gienah	175 44.8	S17 40.4
14		67 16.2	347 09.0	30.0	317 16.3	57.6	42 46.6	03.0	89 37.4	52.7	Hadar	148 37.4	S60 29.2
15		82 18.7	2 08.3	30.3	332 17.3	57.4	57 48.5	03.3	104 39.7	52.6	Hamal	327 53.2	N23 34.2
16		97 21.1	17 07.7	30.6	347 18.3	57.2	72 50.4	03.5	119 42.0	52.5	Kaus Aust.	83 34.2	S34 22.4
17		112 23.6	32 07.1	30.9	2 19.2	57.0	87 52.3	03.7	134 44.3	52.5			
18		127 26.1	47 06.4	N25 31.2	17 20.2	N23 56.8	102 54.2	N 9 03.9	149 46.5	S10 52.4	Kochab	137 18.6	N74 03.5
19		142 28.5	62 05.8	31.4	32 21.2	56.6	117 56.1	04.1	164 48.8	52.4	Markab	13 31.5	N15 19.6
20		157 31.0	77 05.2	31.7	47 22.2	56.4	132 58.0	04.3	179 51.1	52.3	Menkar	314 08.0	N 4 10.7
21		172 33.5	92 04.5	32.0	62 23.2	56.2	147 59.9	04.5	194 53.4	52.2	Menkent	147 58.9	S36 29.1
22		187 35.9	107 03.9	32.3	77 24.2	55.9	163 01.8	04.8	209 55.7	52.2	Miaplacidus	221 38.5	S69 49.0
23		202 38.4	122 03.3	32.5	92 25.2	55.7	178 03.7	05.0	224 58.0	52.1			
30 S U N D A Y		00	217 40.8	137 02.6	N25 32.8	107 26.1	N23 55.5	193 05.6	N 9 05.2	240 00.3	S10 52.0	Mirfak	308 30.8
	01	232 43.3	152 02.0	33.1	122 27.1	55.3	208 07.5	05.4	255 02.5	52.0	Nunki	75 49.4	S26 16.0
	02	247 45.8	167 01.4	33.4	137 28.1	55.1	223 09.4	05.6	270 04.8	51.9	Peacock	53 07.9	S56 39.4
	03	262 48.2	182 00.7	33.6	152 29.1	54.9	238 11.3	05.8	285 07.1	51.9	Pollux	243 19.1	N27 58.3
	04	277 50.7	197 00.1	33.9	167 30.1	54.7	253 13.2	06.0	300 09.4	51.8	Procyon	244 52.4	N 5 09.9
	05	292 53.2	211 59.5	34.2	182 31.1	54.4	268 15.1	06.3	315 11.7	51.7			
	06	307 55.6	226 58.9	N25 34.4	197 32.0	N23 54.2	283 17.0	N 9 06.5	330 14.0	S10 51.7	Rasalhague	95 59.6	N12 32.4
	07	322 58.1	241 58.2	34.7	212 33.0	54.0	298 18.9	06.7	345 16.3	51.6	Regulus	207 35.8	N11 51.2
	08	338 00.6	256 57.6	35.0	227 34.0	53.8	313 20.8	06.9	0 18.6	51.6	Rigel	281 05.5	S 8 10.6
	09	353 03.0	271 57.0	35.2	242 35.0	53.6	328 22.7	07.1	15 20.8	51.5	Rigel Kent.	139 41.6	S60 55.9
	10	8 05.5	286 56.3	35.5	257 36.0	53.4	343 24.6	07.3	30 23.1	51.4	Sabik	102 40.2	S15 45.3
	11	23 07.9	301 55.7	35.7	272 37.0	53.2	358 26.5	07.5	45 25.4	51.4			
	12	38 10.4	316 55.1	N25 36.0	287 37.9	N23 52.9	13 28.4	N 9 07.8	60 27.7	S10 51.3	Schedar	349 33.2	N56 39.7
	13	53 12.9	331 54.4	36.3	302 38.9	52.7	28 30.3	08.0	75 30.0	51.3	Shaula	96 12.0	S37 07.2
	14	68 15.3	346 53.8	36.5	317 39.9	52.5	43 32.2	08.2	90 32.3	51.2	Sirius	258 27.7	S16 45.0
	15	83 17.8	1 53.2	36.8	332 40.9	52.3	58 34.1	08.4	105 34.6	51.1	Spica	158 23.5	S11 17.1
	16	98 20.3	16 52.5	37.0	347 41.9	52.1	73 36.0	08.6	120 36.9	51.1	Suhail	222 47.3	S43 31.8
	17	113 22.7	31 51.9	37.3	2 42.9	51.9	88 37.9	08.8	135 39.2	51.0			
	18	128 25.2	46 51.3	N25 37.5	17 43.8	N23 51.6	103 39.9	N 9 09.0	150 41.4	S10 51.0	Vega	80 34.0	N38 48.0
	19	143 27.7	61 50.7	37.8	32 44.8	51.4	118 41.8	09.2	165 43.7	50.9	Zuben'ubi	136 57.3	S16 08.4
	20	158 30.1	76 50.0	38.0	47 45.8	51.2	133 43.7	09.5	180 46.0	50.8			
	21	173 32.6	91 49.4	38.3	62 46.8	51.0	148 45.6	09.7	195 48.3	50.8			
	22	188 35.1	106 48.8	38.5	77 47.8	50.8	163 47.5	09.9	210 50.6	50.7	Venus	280 36.1	h m
	23	203 37.5	121 48.1	38.8	92 48.8	50.6	178 49.4	10.1	225 52.9	50.7	Mars	250 20.8	16 51
											Jupiter	335 38.2	11 09
										Saturn	22 23.7	8 02	
Mer. Pass. 9 31.7		v −0.6 d 0.3		v 1.0 d 0.2		v 1.9 d 0.2		v 2.3 d 0.1					

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
										28	29		30	1		
	GHA	Dec	GHA	v	Dec	d	HP	Naut.							Civil	h m
28	d h	° /	° /	° /	° /	° /	° /	N 72	h m	h m	h m	h m	h m	h m	h m	h m
	00	180 35.9	N14 00.1	83 06.5	12.6	N23 09.8	8.2 54.2	N 70	///	///	02 11		07 38	11 22	13 35	
	01	195 36.0		97 38.1	12.7	23 01.6	8.4 54.2	68	///	01 29	03 08		09 25	11 46	13 45	
	02	210 36.1		112 09.8	12.7	22 53.2	8.5 54.2	66	///	02 09	03 27	08 26	10 31	12 18	13 59	
	03	225 36.1	02.5	126 41.5	12.7	22 44.7	8.5 54.2	64	///	02 36	03 41	09 05	10 52	12 30	14 05	
	04	240 36.2		141 13.2	12.9	22 36.2	8.7 54.2	62	01 19	02 56	03 54	09 32	11 08	12 40	14 10	
	05	255 36.3	04.1	155 45.1	12.9	22 27.5	8.7 54.2	60	01 55	03 13	04 04	09 53	11 22	12 48	14 14	
	06	270 36.4	N14 04.9	170 17.0	13.0	N22 18.8	8.9 54.2	N 58	02 19	03 26	04 13	10 09	11 33	12 56	14 17	
	07	285 36.5	05.6	184 49.0	13.0	22 09.9	8.9 54.2	56	02 39	03 38	04 21	10 24	11 43	13 02	14 21	
	08	300 36.6	06.4	199 21.0	13.1	22 01.0	9.0 54.2	54	02 54	03 48	04 29	10 36	11 52	13 08	14 24	
FRI DAY	09	315 36.7	07.2	213 53.1	13.1	21 52.0	9.2 54.2	52	03 07	03 57	04 35	10 47	12 00	13 13	14 26	
	10	330 36.8	08.0	228 25.2	13.3	21 42.8	9.2 54.2	50	03 19	04 04	04 41	10 56	12 07	13 18	14 29	
	11	345 36.9	08.8	242 57.5	13.2	21 33.6	9.3 54.2	45	03 41	04 21	04 53	11 16	12 22	13 28	14 34	
	12	0 37.0	N14 09.6	257 29.7	13.4	N21 24.3	9.4 54.2	N 40	03 59	04 34	05 03	11 33	12 35	13 36	14 38	
	13	15 37.1	10.4	272 02.1	13.4	21 14.9	9.5 54.2	35	04 13	04 45	05 12	11 46	12 45	13 44	14 42	
	14	30 37.2	11.2	286 34.5	13.5	21 05.4	9.6 54.2	30	04 24	04 54	05 19	11 58	12 54	13 50	14 45	
	15	45 37.3	11.9	301 07.0	13.5	20 55.8	9.6 54.2	20	04 42	05 09	05 32	12 18	13 10	14 01	14 51	
	16	60 37.3	12.7	315 39.5	13.6	20 46.2	9.8 54.2	N 10	04 56	05 22	05 44	12 36	13 24	14 10	14 56	
	17	75 37.4	13.5	330 12.1	13.6	20 36.4	9.8 54.3	0	05 08	05 33	05 54	12 52	13 36	14 19	15 00	
	18	90 37.5	N14 14.3	344 44.7	13.7	N20 26.6	10.0 54.3	S 10	05 18	05 43	06 04	13 08	13 49	14 28	15 05	
SAT DAY	19	105 37.6	15.1	359 17.4	13.8	20 16.6	10.0 54.3	20	05 26	05 53	06 15	13 25	14 03	14 37	15 10	
	20	120 37.7	15.9	13 50.2	13.8	20 06.6	10.1 54.3	30	05 35	06 03	06 28	13 45	14 18	14 47	15 15	
	21	135 37.8	16.6	28 23.0	13.9	19 56.5	10.2 54.3	35	05 39	06 08	06 35	13 57	14 27	14 54	15 18	
	22	150 37.9	17.4	42 55.9	14.0	19 46.3	10.2 54.3	40	05 43	06 15	06 43	14 10	14 37	15 00	15 22	
	23	165 38.0	18.2	57 28.9	14.0	19 36.1	10.4 54.3	45	05 47	06 21	06 52	14 25	14 49	15 08	15 26	
	00	180 38.1	N14 19.0	72 01.9	14.0	N19 25.7	10.4 54.3	S 50	05 51	06 29	07 03	14 44	15 03	15 18	15 31	
	01	195 38.2	19.8	86 34.9	14.1	19 15.3	10.5 54.3	52	05 53	06 33	07 08	14 53	15 09	15 22	15 33	
	02	210 38.2	20.6	101 08.0	14.2	19 04.8	10.6 54.3	54	05 55	06 37	07 14	15 03	15 17	15 27	15 36	
	03	225 38.3	21.3	115 41.2	14.2	18 54.2	10.7 54.3	56	05 57	06 41	07 20	15 15	15 25	15 32	15 39	
	04	240 38.4	22.1	130 14.4	14.3	18 43.5	10.7 54.3	58	05 59	06 45	07 27	15 28	15 34	15 38	15 42	
SUN DAY	05	255 38.5	22.9	144 47.7	14.3	18 32.8	10.8 54.3	S 60	06 01	06 50	07 36	15 43	15 45	15 45	15 45	
	06	270 38.6	N14 23.7	159 21.0	14.4	N18 22.0	10.9 54.3	Lat.	Sunset	Twilight		Moonset				
	07	285 38.7	24.5	173 54.4	14.4	18 11.1	11.0 54.3			Civil	Naut.	28	29	30	1	
	08	300 38.8	25.2	188 27.8	14.5	18 00.1	11.1 54.3	N 72	h m	h m	h m	h m	h m	h m	h m	h m
	09	315 38.9	26.0	203 01.3	14.5	17 49.0	11.1 54.3									
	10	330 38.9	26.8	217 34.8	14.6	17 37.9	11.2 54.3	N 70	21 50	///	///		07 33	05 18	04 34	
	11	345 39.0	27.6	232 08.4	14.6	17 26.7	11.3 54.4	N 70	21 15	///	///		05 44	04 52	04 21	
	12	0 39.1	N14 28.3	246 42.0	14.7	N17 15.4	11.3 54.4	68	20 50	22 33	///		05 03	04 33	04 11	
	13	15 39.2	29.1	261 15.7	14.7	17 04.1	11.4 54.4	66	20 31	21 50	///	05 07	04 35	04 17	04 02	
	14	30 39.3	29.9	275 49.4	14.8	16 52.7	11.5 54.4	64	20 16	21 22	///	04 27	04 14	04 04	03 55	
MON DAY	15	45 39.4	30.7	290 23.2	14.8	16 41.2	11.6 54.4	62	20 03	21 01	22 43	04 00	03 56	03 53	03 49	
	16	60 39.5	31.4	304 57.0	14.9	16 29.6	11.6 54.4	60	19 52	20 45	22 04	03 38	03 42	03 43	03 43	
	17	75 39.5	32.2	319 30.9	14.9	16 18.0	11.7 54.4	N 58	19 43	20 31	21 39	03 21	03 29	03 35	03 39	
	18	90 39.6	N14 33.0	334 04.8	14.9	N16 06.3	11.8 54.4	56	19 35	20 19	21 19	03 06	03 19	03 27	03 34	
	19	105 39.7	33.8	348 38.7	15.0	15 54.5	11.8 54.4	54	19 28	20 09	21 03	02 53	03 09	03 21	03 30	
	20	120 39.8	34.5	3 12.7	15.1	15 42.7	11.9 54.4	52	19 21	20 00	20 49	02 42	03 01	03 15	03 27	
	21	135 39.9	35.3	17 46.8	15.0	15 30.8	12.0 54.5	50	19 15	19 52	20 38	02 32	02 53	03 09	03 23	
	22	150 40.0	36.1	32 20.8	15.2	15 18.8	12.0 54.5	45	19 03	19 35	20 15	02 11	02 36	02 58	03 16	
	23	165 40.1	36.9	46 55.0	15.1	15 06.8	12.1 54.5	N 40	18 52	19 22	19 57	01 54	02 23	02 48	03 10	
	TUE DAY	00	180 40.1	N14 37.6	61 29.1	15.2	N14 54.7	12.2 54.5	35	18 44	19 11	19 43	01 39	02 11	02 39	03 05
01		195 40.2	38.4	76 03.3	15.3	14 42.5	12.2 54.5	30	18 36	19 01	19 31	01 26	02 01	02 32	03 01	
02		210 40.3	39.2	90 37.6	15.2	14 30.3	12.3 54.5	20	18 23	18 46	19 13	01 05	01 44	02 19	02 53	
03		225 40.4	39.9	105 11.8	15.3	14 18.0	12.3 54.5	N 10	18 11	18 33	18 59	00 46	01 28	02 08	02 45	
04		240 40.5	40.7	119 46.1	15.4	14 05.7	12.4 54.5	0	18 01	18 22	18 47	00 28	01 14	01 57	02 39	
05		255 40.6	41.5	134 20.5	15.4	13 53.3	12.5 54.6	S 10	17 50	18 12	18 37	00 10	00 59	01 46	02 32	
06		270 40.6	N14 42.2	148 54.9	15.4	N13 40.8	12.5 54.6	20	17 39	18 02	18 28	24 43	00 43	01 35	02 25	
07		285 40.7	43.0	163 29.3	15.4	13 28.3	12.6 54.6	30	17 27	17 52	18 20	24 25	00 25	01 21	02 16	
08		300 40.8	43.8	178 03.7	15.5	13 15.7	12.7 54.6	35	17 20	17 46	18 16	24 15	00 15	01 13	02 12	
09		315 40.9	44.6	192 38.2	15.5	13 03.0	12.7 54.6	40	17 12	17 40	18 12	24 03	00 03	01 05	02 06	
WED DAY	10	330 41.0	45.3	207 12.7	15.5	12 50.3	12.8 54.6	45	17 02	17 33	18 07	23 48	24 54	00 54	02 00	
	11	345 41.0	46.1	221 47.2	15.6	12 37.5	12.8 54.6	S 50	16 51	17 25	18 03	23 30	24 41	00 41	01 52	
	12	0 41.1	N14 46.9	236 21.8	15.6	N12 24.7	12.8 54.7	52	16 46	17 21	18 01	23 22	24 35	00 35	01 48	
	13	15 41.2	47.6	250 56.4	15.6	12 11.9	13.0 54.7	54	16 40	17 17	17 59	23 13	24 29	00 29	01 44	
	14	30 41.3	48.4	265 31.0	15.7	11 58.9	13.0 54.7	56	16 34	17 13	17 57	23 02	24 21	00 21	01 40	
	15	45 41.4	49.2	280 05.7	15.7	11 45.9	13.0 54.7	58	16 26	17 09	17 55	22 50	24 13	00 13	01 35	
	16	60 41.4	49.9	294 40.4	15.7	11 32.9	13.1 54.7	S 60	16 18	17 03	17 53	22 35	24 04	00 04	01 29	
	17	75 41.5	50.7	309 15.1	15.7	11 19.8	13.1 54.7	Day	Eqn. of Time	Mer.	Mer. Pass.	Age	Phase			
	18	90 41.6	N14 51.4	323 49.8	15.7	N11 06.7	13.2 54.7									
	19	105 41.7	52.2	338 24.5	15.8	10 53.5	13.3 54.8	d	m s	m s	h m	h m	h m	h m	d	%
20	120 41.8	53.0	352 59.3	15.8	10 40.2	13.2 54.8										
21	135 41.8	53.7	7 34.1	15.8	10 27.0	13.4 54.8	28	02 23	02 28	11 58	19 03	06 40	08 56			
22	150 41.9															

2023 MAY 1, 2, 3 (MON., TUES., WED.)													
UT	ARIES		VENUS −4.2		MARS +1.3		JUPITER −2.1		SATURN +0.9		STARS		
d h	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	
MONDAY	100	218 40.0	136 47.5	N25 39.0	107 49.7	N23 50.3	193 51.3	N 9 10.3	240 55.2	S10 50.6	Acamar	315 13.3	S40 12.8
	01	233 42.4	151 46.9	39.3	122 50.7	50.1	208 53.2	10.5	255 57.5	50.5	Achernar	335 21.8	S57 07.1
	02	248 44.9	166 46.2	39.5	137 51.7	49.9	223 55.1	10.7	270 59.8	50.5	Acrux	173 01.1	S63 13.9
	03	263 47.4	181 45.6	. . 39.7	152 52.7	. . 49.7	238 57.0	. . 11.0	286 02.0	. . 50.4	Adhara	255 07.2	S29 00.4
	04	278 49.8	196 45.0	40.0	167 53.7	49.5	253 58.9	11.2	301 04.3	50.4	Aldebaran	290 41.6	N16 33.3
	05	293 52.3	211 44.4	40.2	182 54.6	49.2	269 00.8	11.4	316 06.6	50.3			
	06	308 54.8	226 43.7	N25 40.5	197 55.6	N23 49.0	284 02.7	N 9 11.6	331 08.9	S10 50.3	Alioth	166 13.7	N55 50.1
	07	323 57.2	241 43.1	40.7	212 56.6	48.8	299 04.6	11.8	346 11.2	50.2	Alkaid	152 52.6	N49 11.9
	08	338 59.7	256 42.5	40.9	227 57.6	48.6	314 06.5	12.0	1 13.5	50.1	Alnair	27 34.8	S46 50.8
	09	354 02.2	271 41.8	. . 41.2	242 58.6	. . 48.4	329 08.4	. . 12.2	16 15.8	. . 50.1	Alnilam	275 39.4	S 1 11.3
	10	9 04.6	286 41.2	41.4	257 59.6	48.1	344 10.3	12.5	31 18.1	50.0	Alphard	217 49.1	S 8 45.7
	11	24 07.1	301 40.6	41.6	273 00.5	47.9	359 12.2	12.7	46 20.4	50.0			
	12	39 09.5	316 40.0	N25 41.9	288 01.5	N23 47.7	14 14.1	N 9 12.9	61 22.7	S10 49.9	Alphecca	126 04.6	N26 38.1
	13	54 12.0	331 39.3	42.1	303 02.5	47.5	29 16.0	13.1	76 25.0	49.8	Alpheratz	357 36.5	N29 12.9
	14	69 14.5	346 38.7	42.3	318 03.5	47.3	44 17.9	13.3	91 27.2	49.8	Altair	62 01.3	N 8 55.6
	15	84 16.9	1 38.1	. . 42.6	333 04.5	. . 47.0	59 19.8	. . 13.5	106 29.5	. . 49.7	Ankaa	353 08.9	S42 10.8
	16	99 19.4	16 37.5	42.8	348 05.4	46.8	74 21.7	13.7	121 31.8	49.7	Antares	112 17.3	S26 29.0
	17	114 21.9	31 36.8	43.0	3 06.4	46.6	89 23.6	13.9	136 34.1	49.6			
	18	129 24.3	46 36.2	N25 43.2	18 07.4	N23 46.4	104 25.5	N 9 14.2	151 36.4	S10 49.5	Arcturus	145 48.9	N19 03.6
	19	144 26.8	61 35.6	43.5	33 08.4	46.1	119 27.4	14.4	166 38.7	49.5	Atria	107 12.3	S69 04.0
	20	159 29.3	76 34.9	43.7	48 09.4	45.9	134 29.4	14.6	181 41.0	49.4	Avior	234 15.4	S59 35.3
	21	174 31.7	91 34.3	. . 43.9	63 10.4	. . 45.7	149 31.3	. . 14.8	196 43.3	. . 49.4	Bellatrix	278 24.7	N 6 22.2
	22	189 34.2	106 33.7	44.1	78 11.3	45.5	164 33.2	15.0	211 45.6	49.3	Betelgeuse	270 53.9	N 7 24.6
	23	204 36.7	121 33.1	44.3	93 12.3	45.3	179 35.1	15.2	226 47.9	49.3			
	TUESDAY	200	219 39.1	136 32.4	N25 44.6	108 13.3	N23 45.0	194 37.0	N 9 15.4	241 50.2	S10 49.2	Canopus	263 53.4
01		234 41.6	151 31.8	44.8	123 14.3	44.8	209 38.9	15.6	256 52.5	49.1	Capella	280 24.4	N46 01.3
02		249 44.0	166 31.2	45.0	138 15.3	44.6	224 40.8	15.9	271 54.8	49.1	Deneb	49 26.8	N45 21.4
03		264 46.5	181 30.6	. . 45.2	153 16.2	. . 44.4	239 42.7	. . 16.1	286 57.0	. . 49.0	Denebola	182 26.2	N14 26.5
04		279 49.0	196 29.9	45.4	168 17.2	44.1	254 44.6	16.3	301 59.3	49.0	Diphda	348 49.0	S17 51.6
05		294 51.4	211 29.3	45.6	183 18.2	43.9	269 46.5	16.5	317 01.6	48.9			
06		309 53.9	226 28.7	N25 45.8	198 19.2	N23 43.7	284 48.4	N 9 16.7	332 03.9	S10 48.8	Dubhe	193 42.4	N61 37.8
07		324 56.4	241 28.1	46.1	213 20.2	43.5	299 50.3	16.9	347 06.2	48.8	Elnath	278 04.0	N28 37.6
08		339 58.8	256 27.4	46.3	228 21.2	43.2	314 52.2	17.1	2 08.5	48.7	Eltanin	90 42.5	N51 28.8
09		355 01.3	271 26.8	. . 46.5	243 22.1	. . 43.0	329 54.1	. . 17.3	17 10.8	. . 48.7	Enif	33 40.3	N 9 58.7
10		10 03.8	286 26.2	46.7	258 23.1	42.8	344 56.0	17.6	32 13.1	48.6	Fomalhaut	15 16.3	S29 29.9
11		25 06.2	301 25.6	46.9	273 24.1	42.6	359 57.9	17.8	47 15.4	48.6			
12		40 08.7	316 24.9	N25 47.1	288 25.1	N23 42.3	14 59.8	N 9 18.0	62 17.7	S10 48.5	Gacrux	171 52.8	S57 14.8
13		55 11.2	331 24.3	47.3	303 26.1	42.1	30 01.7	18.2	77 20.0	48.4	Gienah	175 44.8	S17 40.4
14		70 13.6	346 23.7	47.5	318 27.0	41.9	45 03.6	18.4	92 22.3	48.4	Hadar	148 37.4	S60 29.2
15		85 16.1	1 23.1	. . 47.7	333 28.0	. . 41.6	60 05.5	. . 18.6	107 24.6	. . 48.3	Hamal	327 53.2	N23 34.2
16		100 18.5	16 22.5	47.9	348 29.0	41.4	75 07.4	18.8	122 26.9	48.3	Kaus Aust.	83 34.2	S34 22.4
17		115 21.0	31 21.8	48.1	3 30.0	41.2	90 09.3	19.0	137 29.2	48.2			
18		130 23.5	46 21.2	N25 48.3	18 31.0	N23 41.0	105 11.3	N 9 19.3	152 31.5	S10 48.2	Kochab	137 18.6	N74 03.5
19		145 25.9	61 20.6	48.5	33 31.9	40.7	120 13.2	19.5	167 33.7	48.1	Markab	13 31.5	N15 19.6
20		160 28.4	76 20.0	48.7	48 32.9	40.5	135 15.1	19.7	182 36.0	48.0	Menkar	314 08.0	N 4 10.7
21		175 30.9	91 19.3	. . 48.9	63 33.9	. . 40.3	150 17.0	. . 19.9	197 38.3	. . 48.0	Menkent	147 58.9	S36 29.1
22		190 33.3	106 18.7	49.1	78 34.9	40.0	165 18.9	20.1	212 40.6	47.9	Miaplacidus	221 38.5	S69 49.0
23		205 35.8	121 18.1	49.3	93 35.9	39.8	180 20.8	20.3	227 42.9	47.9			
WEDNESDAY	300	220 38.3	136 17.5	N25 49.4	108 36.8	N23 39.6	195 22.7	N 9 20.5	242 45.2	S10 47.8	Mirfak	308 30.8	N49 56.6
	01	235 40.7	151 16.9	49.6	123 37.8	39.4	210 24.6	20.7	257 47.5	47.8	Nunki	75 49.3	S26 16.0
	02	250 43.2	166 16.2	49.8	138 38.8	39.1	225 26.5	20.9	272 49.8	47.7	Peacock	53 07.9	S56 39.4
	03	265 45.6	181 15.6	. . 50.0	153 39.8	. . 38.9	240 28.4	. . 21.2	287 52.1	. . 47.6	Pollux	243 19.2	N27 58.3
	04	280 48.1	196 15.0	50.2	168 40.8	38.7	255 30.3	21.4	302 54.4	47.6	Procyon	244 52.4	N 5 09.9
	05	295 50.6	211 14.4	50.4	183 41.7	38.4	270 32.2	21.6	317 56.7	47.5			
	06	310 53.0	226 13.8	N25 50.6	198 42.7	N23 38.2	285 34.1	N 9 21.8	332 59.0	S10 47.5	Rasalhague	95 59.6	N12 32.4
	07	325 55.5	241 13.1	50.7	213 43.7	38.0	300 36.0	22.0	348 01.3	47.4	Regulus	207 35.9	N11 51.2
	08	340 58.0	256 12.5	50.9	228 44.7	37.7	315 37.9	22.2	3 03.6	47.4	Rigel	281 05.5	S 8 10.6
	09	356 00.4	271 11.9	. . 51.1	243 45.7	. . 37.5	330 39.8	. . 22.4	18 05.9	. . 47.3	Rigel Kent.	139 41.6	S60 55.9
	10	11 02.9	286 11.3	51.3	258 46.6	37.3	345 41.7	22.6	33 08.2	47.2	Sabik	102 04.1	S15 45.3
	11	26 05.4	301 10.7	51.5	273 47.6	37.0	0 43.6	22.9	48 10.5	47.2			
	12	41 07.8	316 10.0	N25 51.6	288 48.6	N23 36.8	15 45.5	N 9 23.1	63 12.8	S10 47.1	Schedar	349 33.2	N56 39.6
	13	56 10.3	331 09.4	51.8	303 49.6	36.6	30 47.5	23.3	78 15.1	47.1	Shaula	96 12.0	S37 07.2
	14	71 12.8	346 08.8	52.0	318 50.6	36.4	45 49.4	23.5	93 17.4	47.0	Sirius	258 27.7	S16 45.0
	15	86 15.2	1 08.2	. . 52.2	333 51.5	. . 36.1	60 51.3	. . 23.7	108 19.7	. . 47.0	Spica	158 23.5	S11 17.1
	16	101 17.7	16 07.6	52.3	348 52.5	35.9	75 53.2	23.9	123 22.0	46.9	Suhail	222 47.3	S43 31.8
	17	116 20.1	31 06.9	52.5	3 53.5	35.7	90 55.1	24.1	138 24.3	46.9			
	18	131 22.6	46 06.3	N25 52.7	18 54.5	N23 35.4	105 57.0	N 9 24.3	153 26.6	S10 46.8	Vega	80 33.9	N38 48.0
	19	146 25.1	61 05.7	52.8	33 55.5	35.2	120 58.9	24.5	168 28.9	46.7	Zuben'ubi	136 57.3	S16 08.4
	20	161 27.5	76 05.1	53.0	48 56.4	34.9	136 00.8	24.8	183 31.2	46.7			
	21	176 30.0	91 04.5	. . 53.2	63 57.4	. . 34.7	151 02.7	. . 25.0	198 33.5	. . 46.6			
	22	191 32.5	106 03.9	53.3	78 58.4	34.5	166 04.6	25.2	213 35.8	46.6			
	23	206 34.9	121 03.2	53.5	93 59.4	34.2	181 06.5	25.4	228 38.1	46.5			
h m													
Mer.Pass. 9 19.9		v −0.6 d 0.2		v 1.0 d 0.2		v 1.9 d 0.2		v 2.3 d 0.1					
										SHA		Mer.Pass	
										° ' "		h m	
										Venus		276 53.3 14 54	
										Mars		248 34.2 16 46	
										Jupiter		334 57.9 11 00	
										Saturn		22 11.0 7 51	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise									
										1	2		3	4								
	GHA	Dec	GHA	v	Dec	d	HP	Naut.							Civil	h m	h m	h m	h m	h m	h m	
d h	° /	° /	° /		° /			°	h m	h m	h m	h m	h m	h m	h m	h m						
MONDAY	180	42.1	N14	56.0	51	18.6	15.9	N	9	46.8	13.5	54.8	N 72	////	////	01 46	13 35	15 37	17 44	20 07		
	01	195	42.2		56.8	65	53.5	15.8	9	33.3	13.5	54.9	N 70	////	////	02 27	13 45	15 38	17 34	19 43		
	02	210	42.2		57.5	80	28.3	15.9	9	19.8	13.6	54.9	68	////	00 59	02 54	13 53	15 38	17 27	19 24		
	03	225	42.3		58.3	95	03.2	15.9	9	06.2	13.6	54.9	66	////	01 51	03 15	13 59	15 39	17 21	19 10		
	04	240	42.4		59.1	109	38.1	16.0	9	52.6	13.7	54.9	64	////	02 22	03 31	14 05	15 39	17 15	18 58		
	05	255	42.5	14	59.8	124	13.1	15.9	8	38.9	13.7	54.9	62	00 52	02 45	03 45	14 10	15 39	17 11	18 48		
	06	270	42.5	N15	00.6	138	48.0	15.9	N	8	25.2	13.8	55.0	60	01 39	03 03	03 56	14 14	15 39	17 07	18 39	
	07	285	42.6		01.3	153	22.9	16.0	8	11.4	13.7	55.0	N 58	02 07	03 17	04 06	14 17	15 39	17 04	18 32		
	08	300	42.7		02.1	167	57.9	16.0	7	57.7	13.9	55.0	56	02 28	03 30	04 15	14 21	15 39	17 00	18 25		
	09	315	42.8		02.9	182	32.9	15.9	7	43.8	13.9	55.0	54	02 45	03 41	04 22	14 24	15 40	16 58	18 19		
	10	330	42.9		03.6	197	07.8	16.0	7	29.9	13.9	55.0	52	02 59	03 50	04 29	14 26	15 40	16 55	18 14		
	11	345	42.9		04.4	211	42.8	16.0	7	16.0	13.9	55.1	50	03 12	03 59	04 35	14 29	15 40	16 53	18 09		
	12		0 43.0	N15	05.1	226	17.8	16.0	N	7	02.1	14.0	55.1	45	03 36	04 16	04 48	14 34	15 40	16 48	17 59	
	13		15 43.1		05.9	240	52.8	16.0	6	48.1	14.0	55.1	N 40	03 54	04 30	04 59	14 38	15 40	16 44	17 51		
	14		30 43.2		06.6	255	27.8	16.0	6	34.1	14.1	55.1	35	04 09	04 41	05 09	14 42	15 41	16 41	17 44		
	15		45 43.2		07.4	270	02.8	16.0	6	20.0	14.1	55.1	30	04 21	04 51	05 17	14 45	15 41	16 38	17 37		
	16		60 43.3		08.1	284	37.8	16.0	6	05.9	14.1	55.2	20	04 40	05 07	05 30	14 51	15 41	16 33	17 27		
	17		75 43.4		08.9	299	12.8	16.0	5	51.8	14.2	55.2	N 10	04 55	05 21	05 42	14 56	15 41	16 28	17 17		
	18		90 43.5	N15	09.7	313	47.8	16.0	N	5	37.6	14.2	55.2	0	05 07	05 32	05 54	15 00	15 42	16 24	17 09	
	19		105 43.5		10.4	328	22.8	16.0	5	23.4	14.3	55.2	S 10	05 18	05 43	06 05	15 05	15 42	16 20	17 00		
	20		120 43.6		11.2	342	57.8	16.0	5	09.1	14.2	55.3	20	05 27	05 53	06 16	15 10	15 42	16 15	16 51		
	21		135 43.7		11.9	357	32.8	15.9	4	54.9	14.3	55.3	30	05 36	06 05	06 29	15 15	15 43	16 11	16 41		
	22		150 43.7		12.7	12	07.7	16.0	4	40.6	14.4	55.3	35	05 41	06 11	06 37	15 18	15 43	16 08	16 35		
	23		165 43.8		13.4	26	42.7	16.0	4	26.2	14.3	55.3	40	05 45	06 17	06 46	15 22	15 43	16 05	16 28		
	TUESDAY	180	43.9	N15	14.2	41	17.7	16.0	N	4	11.9	14.4	55.3	45	05 50	06 25	06 56	15 26	15 43	16 01	16 20	
01		195	44.0		14.9	55	52.7	15.9	3	57.5	14.4	55.4	S 50	05 55	06 33	07 08	15 31	15 44	15 57	16 11		
02		210	44.0		15.7	70	27.6	16.0	3	43.1	14.5	55.4	52	05 57	06 37	07 13	15 33	15 44	15 55	16 07		
03		225	44.1		16.4	85	02.6	15.9	3	28.6	14.5	55.4	54	05 59	06 41	07 19	15 36	15 44	15 52	16 02		
04		240	44.2		17.2	99	37.5	15.9	3	14.1	14.5	55.4	56	06 02	06 46	07 26	15 39	15 44	15 50	15 57		
05		255	44.3		17.9	114	12.4	15.9	2	59.6	14.5	55.5	58	06 04	06 51	07 34	15 42	15 44	15 47	15 51		
06		270	44.3	N15	18.7	128	47.3	15.9	N	2	45.1	14.5	55.5	S 60	06 07	06 57	07 43	15 45	15 45	15 44	15 45	
07		285	44.4		19.4	143	22.2	15.9	2	30.6	14.6	55.5	Lat. Sunset		Twilight		Moonset					
08		300	44.5		20.2	157	57.1	15.9	2	16.0	14.6	55.5			Civil		Naut.	1	2	3	4	
09		315	44.5		20.9	172	32.0	15.8	2	01.4	14.6	55.6			h m		h m	h m	h m	h m	h m	h m
10		330	44.6		21.6	187	06.8	15.8	1	46.8	14.6	55.6	N 72	22 15	////	////	04 34	04 00	03 28	02 54		
11		345	44.7		22.4	201	41.6	15.8	1	32.2	14.7	55.6	N 70	21 32	////	////	04 21	03 56	03 32	03 06		
12			0 44.8	N15	23.1	216	16.4	15.8	N	1	17.5	14.7	55.6	68	21 03	23 08	////	04 11	03 53	03 35	03 16	
13			15 44.8		23.9	230	51.2	15.8	1	02.8	14.7	55.6	66	20 42	22 08	////	04 02	03 50	03 37	03 24		
14			30 44.9		24.6	245	26.0	15.7	0	48.1	14.7	55.7	64	20 25	21 36	////	03 55	03 47	03 39	03 31		
15			45 45.0		25.4	260	00.7	15.7	0	33.4	14.7	55.7	62	20 11	21 12	23 14	03 49	03 45	03 41	03 37		
16			60 45.0		26.1	274	35.4	15.7	0	18.7	14.8	55.7	60	20 00	20 54	22 20	03 43	03 43	03 43	03 43		
17			75 45.1		26.9	289	10.1	15.7	N	0	03.9	14.7	55.7	N 58	19 50	20 39	21 50	03 39	03 41	03 44	03 47	
18			90 45.2	N15	27.6	303	44.8	15.6	S	0	10.8	14.8	55.8	56	19 41	20 26	21 28	03 34	03 40	03 45	03 51	
19			105 45.2		28.3	318	19.4	15.6	0	25.6	14.8	55.8	54	19 33	20 15	21 11	03 30	03 38	03 47	03 55		
20			120 45.3		29.1	332	54.0	15.6	0	40.4	14.8	55.8	52	19 26	20 05	20 56	03 27	03 37	03 48	03 59		
21			135 45.4		29.8	347	28.6	15.5	0	55.2	14.8	55.8	50	19 20	19 57	20 44	03 23	03 36	03 49	04 02		
22			150 45.4		30.6	2	03.1	15.5	1	10.0	14.8	55.9	45	19 06	19 39	20 19	03 16	03 34	03 51	04 09		
23			165 45.5		31.3	16	37.6	15.5	1	24.8	14.8	55.9	N 40	18 55	19 25	20 01	03 10	03 31	03 52	04 15		
WEDNESDAY		180	45.6	N15	32.1	31	12.1	15.4	S	1	39.6	14.9	55.9	35	18 46	19 13	19 46	03 05	03 30	03 54	04 20	
	01	195	45.6		32.8	45	46.5	15.4	1	54.5	14.8	56.0	30	18 38	19 03	19 34	03 01	03 28	03 55	04 24		
	02	210	45.7		33.5	60	20.9	15.4	2	09.3	14.8	56.0	20	18 24	18 47	19 14	02 53	03 25	03 58	04 32		
	03	225	45.8		34.3	74	55.3	15.3	2	24.1	14.9	56.0	N 10	18 12	18 34	18 59	02 45	03 22	04 00	04 39		
	04	240	45.8		35.0	89	29.6	15.3	2	39.0	14.9	56.0	0	18 00	18 22	18 47	02 39	03 20	04 02	04 45		
	05	255	45.9		35.7	104	03.9	15.2	2	53.9	14.8	56.1	S 10	17 49	18 11	18 36	02 32	03 17	04 04	04 51		
	06	270	46.0	N15	36.5	118	38.1	15.2	S	3	08.7	14.9	56.1	20	17 38	18 00	18 27	02 25	03 15	04 06	04 58	
	07	285	46.0		37.2	133	12.3	15.2	3	23.6	14.8	56.1	30	17 24	17 49	18 18	02 16	03 12	04 08	05 06		
	08	300	46.1		38.0	147	46.5	15.1	3	38.4	14.9	56.1	35	17 17	17 43	18 13	02 12	03 10	04 09	05 11		
	09	315	46.2		38.7	162	20.6	15.1	3	53.3	14.9	56.2	40	17 08	17 36	18 08	02 06	03 08	04 11	05 16		
	10	330	46.2		39.4	176	54.7	15.0	4	08.2	14.8	56.2	45	16 58	17 29	18 04	02 00	03 06	04 13	05 22		
	11	345	46.3		40.2	191	28.7	15.0	4	23.0	14.9	56.2	S 50	16 46	17 20	17 58	01 52	03 03	04 15	05 29		
	12		0 46.4	N15	40.9	206	02.7	14.9	S	4	37.9	14.8	56.2	52	16 40	17 16	17 56	01 48	03 01	04 16	05 33	
	13		15 46.4		41.6	220	36.6	14.9	4	52.7	14.9	56.3	54	16 34	17 12	17 54	01 44					

UT	ARIES			VENUS -4.2			MARS +1.4			JUPITER -2.1			SATURN +0.9			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
d h	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /		° /	° /				
T H U R S D A Y	4 00	221 37.4	136 02.6 N25 53.7	109 00.3 N23 34.0	196 08.4 N 9 25.6	243 40.4 S10 46.5	Acamar	315 13.3 S40 12.8										
	01	236 39.9	151 02.0 53.8	124 01.3 33.8	211 10.3 25.8	258 42.7 46.4	Achernar	335 21.8 S57 07.1										
	02	251 42.3	166 01.4 54.0	139 02.3 33.5	226 12.2 26.0	273 45.0 46.3	Acrux	173 01.1 S63 13.9										
	03	266 44.8	181 00.8 54.1	154 03.3 33.3	241 14.1 26.2	288 47.3 46.3	Adhara	255 07.2 S29 00.4										
	04	281 47.2	196 00.2 54.3	169 04.3 33.1	256 16.0 26.4	303 49.6 46.2	Aldebaran	290 41.6 N16 33.3										
	05	296 49.7	210 59.5 54.5	184 05.2 32.8	271 17.9 26.7	318 51.9 46.2												
	06	311 52.2	225 58.9 N25 54.6	199 06.2 N23 32.6	286 19.9 N 9 26.9	333 54.2 S10 46.1	Alioth	166 13.7 N55 50.1										
	07	326 54.6	240 58.3 54.8	214 07.2 32.4	301 21.8 27.1	348 56.5 46.1	Alkaid	152 52.7 N49 11.9										
	08	341 57.1	255 57.7 54.9	229 08.2 32.1	316 23.7 27.3	3 58.8 46.0	Alnair	27 34.8 S46 50.8										
	09	356 59.6	270 57.1 55.1	244 09.2 31.9	331 25.6 27.5	19 01.1 46.0	Alnilam	275 39.4 S 1 11.3										
	10	12 02.0	285 56.5 55.2	259 10.1 31.6	346 27.5 27.7	34 03.4 45.9	Alphard	217 49.1 S 8 45.7										
	11	27 04.5	300 55.9 55.4	274 11.1 31.4	1 29.4 27.9	49 05.7 45.8												
	12	42 07.0	315 55.2 N25 55.5	289 12.1 N23 31.2	16 31.3 N 9 28.1	64 08.0 S10 45.8	Alphecca	126 04.6 N26 38.1										
	13	57 09.4	330 54.6 55.7	304 13.1 30.9	31 33.2 28.3	79 10.3 45.7	Alpheratz	357 36.5 N29 12.9										
	14	72 11.9	345 54.0 55.8	319 14.1 30.7	46 35.1 28.5	94 12.6 45.7	Altair	62 01.2 N 8 55.6										
	15	87 14.4	0 53.4 56.0	334 15.0 30.5	61 37.0 28.8	109 14.9 45.6	Ankaa	353 08.9 S42 10.7										
	16	102 16.8	15 52.8 56.1	349 16.0 30.2	76 38.9 29.0	124 17.2 45.6	Antares	112 17.2 S26 29.0										
	17	117 19.3	30 52.2 56.3	4 17.0 30.0	91 40.8 29.2	139 19.5 45.5												
	18	132 21.7	45 51.6 N25 56.4	19 18.0 N23 29.7	106 42.7 N 9 29.4	154 21.8 S10 45.5	Arcturus	145 48.9 N19 03.6										
	19	147 24.2	60 51.0 56.5	34 18.9 29.5	121 44.6 29.6	169 24.1 45.4	Atria	107 12.3 S69 04.0										
	20	162 26.7	75 50.3 56.7	49 19.9 29.3	136 46.5 29.8	184 26.4 45.4	Avior	234 15.4 S59 35.3										
	21	177 29.1	90 49.7 56.8	64 20.9 29.0	151 48.4 30.0	199 28.7 45.3	Bellatrix	278 24.7 N 6 22.2										
	22	192 31.6	105 49.1 57.0	79 21.9 28.8	166 50.4 30.2	214 31.0 45.2	Betelgeuse	270 53.9 N 7 24.6										
	23	207 34.1	120 48.5 57.1	94 22.9 28.5	181 52.3 30.4	229 33.3 45.2												
F R I D A Y	5 00	222 36.5	135 47.9 N25 57.2	109 23.8 N23 28.3	196 54.2 N 9 30.7	244 35.6 S10 45.1	Canopus	263 53.4 S52 42.7										
	01	237 39.0	150 47.3 57.4	124 24.8 28.1	211 56.1 30.9	259 37.9 45.1	Capella	280 24.4 N46 01.3										
	02	252 41.5	165 46.7 57.5	139 25.8 27.8	226 58.0 31.1	274 40.2 45.0	Deneb	49 26.7 N45 21.4										
	03	267 43.9	180 46.1 57.6	154 26.8 27.6	241 59.9 31.3	289 42.5 45.0	Denebola	182 26.2 N14 26.5										
	04	282 46.4	195 45.5 57.8	169 27.7 27.3	257 01.8 31.5	304 44.8 44.9	Diphda	348 49.0 S17 51.6										
	05	297 48.9	210 44.9 57.9	184 28.7 27.1	272 03.7 31.7	319 47.1 44.9												
	06	312 51.3	225 44.2 N25 58.0	199 29.7 N23 26.8	287 05.6 N 9 31.9	334 49.4 S10 44.8	Dubhe	193 42.4 N61 37.8										
	07	327 53.8	240 43.6 58.1	214 30.7 26.6	302 07.5 32.1	349 51.7 44.8	Elnath	278 04.0 N28 37.6										
	08	342 56.2	255 43.0 58.3	229 31.7 26.4	317 09.4 32.3	4 54.0 44.7	Eltanin	90 42.5 N51 28.9										
	09	357 58.7	270 42.4 58.4	244 32.6 26.1	332 11.3 32.5	19 56.3 44.6	Enif	33 40.2 N 9 58.7										
	10	13 01.2	285 41.8 58.5	259 33.6 25.9	347 13.2 32.8	34 58.6 44.6	Fomalhaut	15 16.3 S29 29.9										
	11	28 03.6	300 41.2 58.6	274 34.6 25.6	2 15.1 33.0	50 00.9 44.5												
	12	43 06.1	315 40.6 N25 58.8	289 35.6 N23 25.4	17 17.0 N 9 33.2	65 03.2 S10 44.5	Gacrux	171 52.8 S57 14.8										
	13	58 08.6	330 40.0 58.9	304 36.5 25.1	32 19.0 33.4	80 05.5 44.4	Gienah	175 44.8 S17 40.4										
	14	73 11.0	345 39.4 59.0	319 37.5 24.9	47 20.9 33.6	95 07.8 44.4	Hadar	148 37.4 S60 29.2										
	15	88 13.5	0 38.8 59.1	334 38.5 24.7	62 22.8 33.8	110 10.1 44.3	Hamal	327 53.2 N23 34.2										
	16	103 16.0	15 38.2 59.2	349 39.5 24.4	77 24.7 34.0	125 12.4 44.3	Kaus Aust.	83 34.1 S34 22.4										
	17	118 18.4	30 37.6 59.3	4 40.5 24.2	92 26.6 34.2	140 14.7 44.2												
	18	133 20.9	45 37.0 N25 59.5	19 41.4 N23 23.9	107 28.5 N 9 34.4	155 17.0 S10 44.2	Kochab	137 18.6 N74 03.6										
	19	148 23.3	60 36.4 59.6	34 42.4 23.7	122 30.4 34.6	170 19.3 44.1	Markab	13 31.5 N15 19.6										
	20	163 25.8	75 35.7 59.7	49 43.4 23.4	137 32.3 34.8	185 21.6 44.1	Menkar	314 08.0 N 4 10.7										
	21	178 28.3	90 35.1 59.8	64 44.4 23.2	152 34.2 35.1	200 23.9 44.0	Menkent	147 58.9 S36 29.2										
	22	193 30.7	105 34.5 25 59.9	79 45.3 22.9	167 36.1 35.3	215 26.2 43.9	Miaplacidus	221 38.6 S69 49.0										
	23	208 33.2	120 33.9 26 00.0	94 46.3 22.7	182 38.0 35.5	230 28.5 43.9												
S A T U R D A Y	6 00	223 35.7	135 33.3 N26 00.1	109 47.3 N23 22.4	197 39.9 N 9 35.7	245 30.9 S10 43.8	Mirfak	308 30.8 N49 56.6										
	01	238 38.1	150 32.7 00.2	124 48.3 22.2	212 41.8 35.9	260 33.2 43.8	Nunki	75 49.3 S26 16.0										
	02	253 40.6	165 32.1 00.3	139 49.3 21.9	227 43.8 36.1	275 35.5 43.7	Peacock	53 07.9 S56 39.4										
	03	268 43.1	180 31.5 00.4	154 50.2 21.7	242 45.7 36.3	290 37.8 43.7	Pollux	243 19.2 N27 58.3										
	04	283 45.5	195 30.9 00.5	169 51.2 21.5	257 47.6 36.5	305 40.1 43.6	Procyon	244 52.5 N 5 09.9										
	05	298 48.0	210 30.3 00.6	184 52.2 21.2	272 49.5 36.7	320 42.4 43.6												
	06	313 50.5	225 29.7 N26 00.7	199 53.2 N23 21.0	287 51.4 N 9 36.9	335 44.7 S10 43.5	Rasalhague	95 59.6 N12 32.4										
	07	328 52.9	240 29.1 00.8	214 54.1 20.7	302 53.3 37.1	350 47.0 43.5	Regulus	207 35.9 N11 51.2										
	08	343 55.4	255 28.5 00.9	229 55.1 20.5	317 55.2 37.4	5 49.3 43.4	Rigel	281 05.5 S 8 10.6										
	09	358 57.8	270 27.9 01.0	244 56.1 20.2	332 57.1 37.6	20 51.6 43.4	Rigel Kent.	139 41.6 S60 55.9										
	10	14 00.3	285 27.3 01.1	259 57.1 20.0	347 59.0 37.8	35 53.9 43.3	Sabik	102 04.1 S15 45.3										
	11	29 02.8	300 26.7 01.2	274 58.0 19.7	3 00.9 38.0	50 56.2 43.3												
	12	44 05.2	315 26.1 N26 01.3	289 59.0 N23 19.5	18 02.8 N 9 38.2	65 58.5 S10 43.2	Schedar	349 33.2 N56 39.6										
	13	59 07.7	330 25.5 01.4	305 00.0 19.2	33 04.7 38.4	81 00.8 43.1	Shaula	96 12.0 S37 07.2										
	14	74 10.2	345 24.9 01.5	320 01.0 19.0	48 06.6 38.6	96 03.1 43.1	Sirius	258 27.7 S16 45.0										
	15	89 12.6	0 24.3 01.6	335 02.0 18.7	63 08.6 38.8	111 05.4 43.0	Spica	158 23.5 S11 17.0										
	16	104 15.1	15 23.7 01.7	350 02.9 18.5	78 10.5 39.0	126 07.7 43.0	Suhail	222 47.4 S43 31.8										
	17	119 17.6	30 23.1 01.8	5 03.9 18.2	93 12.4 39.2	141 10.1 42.9												
	18	134 20.0	45 22.5 N26 01.9	20 04.9 N23 18.0	108 14.3 N 9 39.4	156 12.4 S10 42.9	Vega	80 33.9 N38 48.0										
	19	149 22.5	60 21.9 01.9	35 05.9 17.7	123 16.2 39.6	171 14.7 42.8	Zuben'ubi	136 57.3 S16 08.4										
	20	164 25.0	75 21.3 02.0	50 06.8 17.5	138 18.1 39.9	186 17.0 42.8												
	21	179 27.4	90 20.7 02.1	65 07.8 17.2	153 20.0 40.1	201 19.3 42.7												
	22	194 29.9	105 20.1 02.2	80 08.8 17.0	168 21.9 40.3	216 21.6 42.7	Venus	273 11.4 h 14 57										
	23	209 32.3	120 19.5 02.3	95 09.8 16.7	183 23.8 40.5	231 23.9 42.6	Mars	246 47.3 16 41										
														Jupiter	334 17.6 10 51			
Mer. Pass. 9 08.1																		

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise										
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>	HP	Naut.		Civil	4		5	6	7								
d h	° / ' "	° / ' "	° / ' "		° / ' "			°	h m	h m	h m	h m	h m	h m	h m	h m							
4 00	180	47.1	N15	49.7	20	46.2	14.3	S	7	35.6	14.7	56.6	N 72	////	////	01 17	20 07						
	01	195	47.2		50.4	35	19.5	14.2		7	50.3	14.7	56.6	N 70	////	////	02 08	19 43	22 32				
	02	210	47.2		51.1	49	52.7	14.1		8	05.0	14.7	56.6	68	////	////	02 40	19 24	21 44				
	03	225	47.3		51.9	64	25.8	14.0		8	19.7	14.6	56.6	66	////	01 31	03 03	19 10	21 13	23 57			
	04	240	47.4		52.6	78	58.8	14.0		8	34.3	14.7	56.7	64	////	02 07	03 21	18 58	20 51	23 01			
05	255	47.4		53.3	93	31.8	13.9		8	49.0	14.6	56.7	62	////	02 33	03 36	18 48	20 33	22 28	24 35			
06	270	47.5	N15	54.1	108	04.7	13.9	S	9	03.6	14.6	56.7	60	01 21	02 53	03 48	18 39	20 18	22 04	23 52			
T H U R S D A Y	07	285	47.5	54.8	122	37.6	13.8		9	18.2	14.6	56.8	N 58	01 54	03 09	03 59	18 32	20 06	21 45	23 24			
	08	300	47.6		55.5	137	10.4	13.7		9	32.8	14.5	56.8	56	02 18	03 22	04 08	18 25	19 55	21 29	23 02		
	09	315	47.7		56.2	151	43.1	13.6		9	47.3	14.5	56.8	54	02 36	03 34	04 16	18 19	19 46	21 15	22 44		
	10	330	47.7		57.0	166	15.7	13.5		10	01.8	14.5	56.8	52	02 52	03 44	04 24	18 14	19 37	21 03	22 29		
	11	345	47.8		57.7	180	48.2	13.5		10	16.3	14.4	56.9	50	03 05	03 53	04 30	18 09	19 30	20 53	22 16		
	12	0	47.8	N15	58.4	195	20.7	13.4	S10	30.7	14.4	56.9	45	03 30	04 11	04 44	17 59	19 14	20 31	21 49			
	13	15	47.9		59.1	209	53.1	13.3		10	45.1	14.4	56.9	N 40	03 50	04 26	04 56	17 51	19 01	20 14	21 27		
	14	30	48.0	15	59.8	224	25.4	13.3		10	59.5	14.4	56.9	35	04 05	04 38	05 06	17 44	18 50	19 59	21 10		
	15	45	48.0	16	00.6	238	57.7	13.2		11	13.9	14.3	57.0	30	04 18	04 49	05 14	17 37	18 40	19 47	20 55		
	16	60	48.1		01.3	253	29.9	13.0		11	28.2	14.2	57.0	20	04 38	05 06	05 29	17 27	18 24	19 25	20 29		
	17	75	48.1		02.0	268	01.9	13.0		11	42.4	14.3	57.0	N 10	04 54	05 20	05 41	17 17	18 10	19 07	20 07		
	18	90	48.2	N16	02.7	282	33.9	13.0	S11	56.7	14.1	57.1	0	05 07	05 32	05 53	17 09	17 57	18 49	19 47			
	19	105	48.3		03.5	297	05.9	12.8		12	10.8	14.2	57.1	S 10	05 18	05 43	06 05	17 00	17 44	18 32	19 26		
	20	120	48.3		04.2	311	37.7	12.7		12	25.0	14.1	57.1	20	05 28	05 54	06 17	16 51	17 30	18 14	19 05		
	21	135	48.4		04.9	326	09.4	12.7		12	39.1	14.1	57.1	30	05 38	06 06	06 31	16 41	17 14	17 53	18 40		
	22	150	48.4		05.6	340	41.1	12.6		12	53.2	14.0	57.2	35	05 43	06 13	06 39	16 35	17 05	17 41	18 25		
	23	165	48.5		06.3	355	12.7	12.5		13	07.2	13.9	57.2	40	05 48	06 20	06 49	16 28	16 55	17 28	18 08		
	5 00	180	48.5	N16	07.1	9	44.2	12.4	S13	21.1	13.9	57.2	S 50	05 59	06 37	07 12	16 11	16 28	16 51	17 23			
01		195	48.6	07.8	24	15.6	12.3		13	35.0	13.9	57.2	52	06 01	06 42	07 18	16 07	16 22	16 42	17 11			
02		210	48.6		08.5	38	46.9	12.2		13	48.9	13.8	57.3	54	06 04	06 46	07 25	16 02	16 14	16 31	16 57		
03		225	48.7		09.2	53	18.1	12.1		14	02.7	13.8	57.3	56	06 07	06 51	07 32	15 57	16 06	16 20	16 41		
04		240	48.8		09.9	67	49.2	12.0		14	16.5	13.7	57.3	58	06 10	06 57	07 40	15 51	15 57	16 06	16 22		
05	255	48.8		10.6	82	20.2	12.0		14	30.2	13.6	57.4	S 60	06 13	07 03	07 50	15 45	15 46	15 50	15 59			
F R I D A Y	06	270	48.9	N16	11.4	96	51.2	11.8	S14	43.8	13.6	57.4											
	07	285	48.9		12.1	111	22.0	11.8		14	57.4	13.5	57.4	Lat.	Sunset	Twilight		Moonset					
	08	300	49.0		12.8	125	52.8	11.6		15	10.9	13.5	57.4			Civil	Naut.	4	5	6	7		
	09	315	49.0		13.5	140	23.4	11.6		15	24.4	13.4	57.5					h m	h m	h m	h m		
	10	330	49.1		14.2	154	54.0	11.4		15	37.8	13.3	57.5	N 72	h m	h m	h m	h m	h m	h m	h m		
	11	345	49.1		14.9	169	24.4	11.4		15	51.1	13.3	57.5	22 47	////	////	02 54	02 05					
	12	0	49.2	N16	15.6	183	54.8	11.2	S16	04.4	13.1	57.5	N 70	21 50	////	////	03 06	02 32	01 25				
	13	15	49.2		16.3	198	25.0	11.2		16	17.5	13.2	57.6	68	21 17	////	////	03 16	02 52	02 15			
	14	30	49.3		17.1	212	55.2	11.0		16	30.7	13.0	57.6	66	20 53	22 29	////	03 24	03 08	02 46	01 54		
	15	45	49.3		17.8	227	25.2	11.0		16	43.7	13.0	57.6	64	20 35	21 50	////	03 31	03 22	03 10	02 51		
	16	60	49.4		18.5	241	55.2	10.8		16	56.7	12.9	57.6	62	20 20	21 23	////	03 37	03 33	03 29	03 25		
	17	75	49.5		19.2	256	25.0	10.8		17	09.6	12.9	57.7	60	20 07	21 03	22 39	03 43	03 43	03 45	03 50		
	18	90	49.5	N16	19.9	270	54.8	10.6	S17	22.5	12.7	57.7	N 58	19 56	20 47	22 03	03 47	03 51	03 58	04 09			
	19	105	49.6		20.6	285	24.4	10.5		17	35.2	12.7	57.7	56	19 47	20 33	21 38	03 51	03 59	04 10	04 26		
	20	120	49.6		21.3	299	53.9	10.5		17	47.9	12.6	57.7	54	19 38	20 21	21 19	03 55	04 06	04 20	04 40		
	21	135	49.7		22.0	314	23.4	10.3		18	00.5	12.5	57.8	52	19 31	20 11	21 04	03 59	04 12	04 29	04 52		
	22	150	49.7		22.7	328	52.7	10.2		18	13.0	12.4	57.8	50	19 24	20 02	20 50	04 02	04 17	04 37	05 03		
	23	165	49.8		23.4	343	21.9	10.1		18	25.4	12.3	57.8	45	19 10	19 43	20 24	04 09	04 29	04 54	05 26		
6 00	180	49.8	N16	24.2	357	51.0	10.0	S18	37.7	12.3	57.8	N 40	18 58	19 28	20 04	04 15	04 39	05 09	05 45				
	01	195	49.9		24.9	12	20.0	9.9		18	50.0	12.1	57.9	35	18 48	19 16	19 49	04 20	04 48	05 21	06 00		
	02	210	49.9		25.6	26	48.9	9.7		19	02.1	12.1	57.9	30	18 40	19 05	19 36	04 24	04 56	05 32	06 14		
	03	225	50.0		26.3	41	17.6	9.7		19	14.2	12.0	57.9	20	18 25	18 48	19 16	04 32	05 09	05 50	06 37		
	04	240	50.0		27.0	55	46.3	9.6		19	26.2	11.9	57.9	N 10	18 12	18 34	19 00	04 39	05 20	06 06	06 57		
05	255	50.1		27.7	70	14.9	9.4		19	38.1	11.7	58.0	0	18 00	18 22	18 47	04 45	05 31	06 21	07 16			
S A T U R D A Y	06	270	50.1	N16	28.4	84	43.3	9.3	S19	49.8	11.7	58.0	S 10	17 48	18 10	18 35	04 51	05 42	06 36	07 35			
	07	285	50.2		29.1	99	11.6	9.3		20	01.5	11.6	58.0	20	17 36	17 59	18 25	04 58	05 54	06 53	07 55		
	08	300	50.2		29.8	113	39.9	9.1		20	13.1	11.5	58.0	30	17 22	17 47	18 15	05 06	06 07	07 12	08 19		
	09	315	50.2		30.5	128	08.0	9.0		20	24.6	11.4	58.0	35	17 14	17 40	18 10	05 11	06 15	07 23	08 33		
	10	330	50																				

UT	ARIES		VENUS -4.2		MARS +1.4		JUPITER -2.1		SATURN +0.9		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
SUNDAY	d h	° ' "	d h	° ' "	d h	° ' "	d h	° ' "	d h	° ' "		° ' "	° ' "
	7 00	224 34.8	135 18.9 N26	02.4	110 10.7 N23	16.5	198 25.7 N 9	40.7	246 26.2 S10	42.6	Acamar	315 13.3 S40	12.7
	01	239 37.3	150 18.3	02.4	125 11.7	16.2	213 27.6	40.9	261 28.5	42.5	Achernar	335 21.8 S57	07.1
	02	254 39.7	165 17.7	02.5	140 12.7	16.0	228 29.5	41.1	276 30.8	42.5	Acrux	173 01.1 S63	13.9
	03	269 42.2	180 17.1	02.6	155 13.7	15.7	243 31.5	41.3	291 33.1	42.4	Adhara	255 07.2 S29	00.4
	04	284 44.7	195 16.5	02.7	170 14.6	15.4	258 33.4	41.5	306 35.4	42.4	Aldebaran	290 41.6 N16	33.3
	05	299 47.1	210 16.0	02.7	185 15.6	15.2	273 35.3	41.7	321 37.8	42.3			
	06	314 49.6	225 15.4 N26	02.8	200 16.6 N23	14.9	288 37.2 N 9	41.9	336 40.1 S10	42.3	Alioth	166 13.7 N55	50.2
	07	329 52.1	240 14.8	02.9	215 17.6	14.7	303 39.1	42.1	351 42.4	42.2	Alkaid	152 52.7 N49	11.9
	08	344 54.5	255 14.2	03.0	230 18.6	14.4	318 41.0	42.4	6 44.7	42.2	Alnair	27 34.8 S46	50.8
	09	359 57.0	270 13.6	03.0	245 19.5	14.2	333 42.9	42.6	21 47.0	42.1	Alnilam	275 39.4 S 1	11.3
	10	14 59.5	285 13.0	03.1	260 20.5	13.9	348 44.8	42.8	36 49.3	42.1	Alphard	217 49.1 S 8	45.7
	11	30 01.9	300 12.4	03.2	275 21.5	13.7	3 46.7	43.0	51 51.6	42.0			
	12	45 04.4	315 11.8 N26	03.2	290 22.5 N23	13.4	18 48.6 N 9	43.2	66 53.9 S10	41.9	Alphecca	126 04.6 N26	38.1
	13	60 06.8	330 11.2	03.3	305 23.4	13.2	33 50.5	43.4	81 56.2	41.9	Alpheratz	357 36.5 N29	12.9
	14	75 09.3	345 10.6	03.4	320 24.4	12.9	48 52.4	43.6	96 58.5	41.8	Altair	62 01.2 N 8	55.6
	15	90 11.8	0 10.0	03.4	335 25.4	12.6	63 54.4	43.8	112 00.8	41.8	Ankaa	353 08.9 S42	10.7
	16	105 14.2	15 09.4	03.5	350 26.4	12.4	78 56.3	44.0	127 03.2	41.7	Antares	112 17.2 S26	29.0
	17	120 16.7	30 08.8	03.6	5 27.3	12.1	93 58.2	44.2	142 05.5	41.7			
	18	135 19.2	45 08.3 N26	03.6	20 28.3 N23	11.9	109 00.1 N 9	44.4	157 07.8 S10	41.6	Arcturus	145 48.9 N19	03.6
	19	150 21.6	60 07.7	03.7	35 29.3	11.6	124 02.0	44.6	172 10.1	41.6	Atria	107 12.2 S69	04.0
	20	165 24.1	75 07.1	03.7	50 30.3	11.4	139 03.9	44.8	187 12.4	41.5	Avior	234 15.5 S59	35.3
	21	180 26.6	90 06.5	03.8	65 31.2	11.1	154 05.8	45.1	202 14.7	41.5	Bellatrix	278 24.7 N 6	22.2
	22	195 29.0	105 05.9	03.8	80 32.2	10.9	169 07.7	45.3	217 17.0	41.4	Betelgeuse	270 53.9 N 7	24.6
	23	210 31.5	120 05.3	03.9	95 33.2	10.6	184 09.6	45.5	232 19.3	41.4			
MONDAY	8 00	225 33.9	135 04.7 N26	03.9	110 34.2 N23	10.3	199 11.5 N 9	45.7	247 21.6 S10	41.3	Canopus	263 53.4 S52	42.7
	01	240 36.4	150 04.1	04.0	125 35.1	10.1	214 13.4	45.9	262 24.0	41.3	Capella	280 24.4 N46	01.3
	02	255 38.9	165 03.5	04.1	140 36.1	09.8	229 15.4	46.1	277 26.3	41.2	Deneb	49 26.7 N45	21.4
	03	270 41.3	180 03.0	04.1	155 37.1	09.6	244 17.3	46.3	292 28.6	41.2	Denebola	182 26.2 N14	26.5
	04	285 43.8	195 02.4	04.1	170 38.1	09.3	259 19.2	46.5	307 30.9	41.1	Diphda	348 49.0 S17	51.6
	05	300 46.3	210 01.8	04.2	185 39.0	09.0	274 21.1	46.7	322 33.2	41.1			
	06	315 48.7	225 01.2 N26	04.2	200 40.0 N23	08.8	289 23.0 N 9	46.9	337 35.5 S10	41.0	Dubhe	193 42.4 N61	37.8
	07	330 51.2	240 00.6	04.3	215 41.0	08.5	304 24.9	47.1	352 37.8	41.0	Elnath	278 04.0 N28	37.6
	08	345 53.7	255 00.0	04.3	230 42.0	08.3	319 26.8	47.3	7 40.1	40.9	Eltanin	90 42.4 N51	28.9
	09	0 56.1	269 59.4	04.4	245 42.9	08.0	334 28.7	47.5	22 42.5	40.9	Enif	33 40.2 N 9	58.7
	10	15 58.6	284 58.9	04.4	260 43.9	07.7	349 30.6	47.8	37 44.8	40.8	Fomalhaut	15 16.2 S29	29.9
	11	31 01.1	299 58.3	04.5	275 44.9	07.5	4 32.5	48.0	52 47.1	40.8			
	12	46 03.5	314 57.7 N26	04.5	290 45.9 N23	07.2	19 34.5 N 9	48.2	67 49.4 S10	40.7	Gacrux	171 52.8 S57	14.8
	13	61 06.0	329 57.1	04.5	305 46.8	07.0	34 36.4	48.4	82 51.7	40.7	Gienah	175 44.8 S17	40.4
	14	76 08.4	344 56.5	04.6	320 47.8	06.7	49 38.3	48.6	97 54.0	40.6	Hadar	148 37.4 S60	29.2
	15	91 10.9	359 55.9	04.6	335 48.8	06.4	64 40.2	48.8	112 56.3	40.6	Hamal	327 53.1 N23	34.2
	16	106 13.4	14 55.4	04.6	350 49.8	06.2	79 42.1	49.0	127 58.6	40.5	Kaus Aust.	83 34.1 S34	22.4
	17	121 15.8	29 54.8	04.7	5 50.7	05.9	94 44.0	49.2	143 01.0	40.5			
	18	136 18.3	44 54.2 N26	04.7	20 51.7 N23	05.7	109 45.9 N 9	49.4	158 03.3 S10	40.4	Kochab	137 18.6 N74	03.6
	19	151 20.8	59 53.6	04.7	35 52.7	05.4	124 47.8	49.6	173 05.6	40.4	Markab	13 31.5 N15	19.6
	20	166 23.2	74 53.0	04.8	50 53.7	05.1	139 49.7	49.8	188 07.9	40.3	Menkar	314 08.0 N 4	10.7
	21	181 25.7	89 52.4	04.8	65 54.6	04.9	154 51.6	50.0	203 10.2	40.3	Menkent	147 58.9 S36	29.2
	22	196 28.2	104 51.9	04.8	80 55.6	04.6	169 53.6	50.2	218 12.5	40.2	Miaplacidus	221 38.6 S69	49.0
	23	211 30.6	119 51.3	04.9	95 56.6	04.3	184 55.5	50.4	233 14.8	40.2			
TUESDAY	9 00	226 33.1	134 50.7 N26	04.9	110 57.6 N23	04.1	199 57.4 N 9	50.6	248 17.2 S10	40.1	Mirfak	308 30.8 N49	56.5
	01	241 35.6	149 50.1	04.9	125 58.5	03.8	214 59.3	50.9	263 19.5	40.1	Nunki	75 49.3 S26	16.0
	02	256 38.0	164 49.5	04.9	140 59.5	03.6	230 01.2	51.1	278 21.8	40.0	Peacock	53 07.8 S56	39.4
	03	271 40.5	179 49.0	04.9	156 00.5	03.3	245 03.1	51.3	293 24.1	40.0	Pollux	243 19.2 N27	58.3
	04	286 42.9	194 48.4	05.0	171 01.5	03.0	260 05.0	51.5	308 26.4	39.9	Procyon	244 52.5 N 5	09.9
	05	301 45.4	209 47.8	05.0	186 02.4	02.8	275 06.9	51.7	323 28.7	39.9			
	06	316 47.9	224 47.2 N26	05.0	201 03.4 N23	02.5	290 08.8 N 9	51.9	338 31.0 S10	39.8	Rasalhague	95 59.6 N12	32.4
	07	331 50.3	239 46.7	05.0	216 04.4	02.2	305 10.7	52.1	353 33.4	39.8	Regulus	207 35.9 N11	51.2
	08	346 52.8	254 46.1	05.0	231 05.4	02.0	320 12.7	52.3	8 35.7	39.7	Rigel	281 05.5 S 8	10.6
	09	1 55.3	269 45.5	05.1	246 06.3	01.7	335 14.6	52.5	23 38.0	39.7	Rigil Kent.	139 41.6 S60	55.9
	10	16 57.7	284 44.9	05.1	261 07.3	01.4	350 16.5	52.7	38 40.3	39.6	Sabik	102 04.1 S15	45.3
	11	32 00.2	299 44.4	05.1	276 08.3	01.2	5 18.4	52.9	53 42.6	39.6			
	12	47 02.7	314 43.8 N26	05.1	291 09.3 N23	00.9	20 20.3 N 9	53.1	68 44.9 S10	39.5	Schedar	349 33.1 N56	39.6
	13	62 05.1	329 43.2	05.1	306 10.2	00.6	35 22.2	53.3	83 47.3	39.5	Shaula	96 11.9 S37	07.2
	14	77 07.6	344 42.6	05.1	321 11.2	00.4	50 24.1	53.5	98 49.6	39.4	Sirius	258 27.7 S16	45.0
	15	92 10.1	359 42.1	05.1	336 12.2	23 00.1	65 26.0	53.7	113 51.9	39.4	Spica	158 23.5 S11	17.1
	16	107 12.5	14 41.5	05.1	351 13.2	22 59.8	80 27.9	53.9	128 54.2	39.3	Suhail	222 47.4 S43	31.8
	17	122 15.0	29 40.9	05.1	6 14.1	59.6	95 29.9	54.1	143 56.5	39.3			
	18	137 17.4	44 40.3 N26	05.2	21 15.1 N22	59.3	110 31.8 N 9	54.4	158 58.8 S10	39.2	Vega	80 33.9 N38	48.0
	19	152 19.9	59 39.8	05.2	36 16.1	59.0	125 33.7	54.6	174 01.2	39.2	Zuben'ubi	136 57.2 S16	08.4
	20	167 22.4	74 39.2	05.2	51 17.1	58.8	140 35.6	54.8	189 03.5	39.1		SHA	Mer.Pass.
	21	182 24.8	89 38.6	05.2	66 18.0	58.5	155 37.5	55.0	204 05.8	39.1		° ' "	h m
	22	197 27.3	104 38.1	05.2	81 19.0	58.2	170 39.4	55.2	219 08.1	39.1	Venus	269 30.8	15 00
	23	212 29.8	119 37.5	05.2	96 20.0	58.0	185 41.3	55.4	234 10.4	39.0	Mars	245 00.2	16 37
											Jupiter	333 37.6	10 42
Mer.Pass. 8 56.3											Saturn	21 47.7	7 29

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	ν	Dec	d	HP	Naut.		Civil	7		8	9	10	
SUNDAY	d h	° /	° /	° /	° /	° /	° /	N 72	h m	h m	h m	h m	h m	h m	h m	h m
	7 00	180 50.9	N16 41.0	344 56.3	7.3	S23 03.4	9.6 58.4	N 70	///	///	00 32					
	01	195 51.0	41.7	359 22.6	7.2	23 13.0	9.4 58.4	68	///	///	01 48					
	02	210 51.0	42.4	13 48.8	7.1	23 22.4	9.4 58.4	66	///	01 06	02 51					
	03	225 51.1	43.1	28 14.9	7.0	23 31.8	9.2 58.4	64	///	01 52	03 11					
	04	240 51.1	43.8	42 40.9	6.9	23 41.0	9.1 58.4	62	///	02 21	03 27	24 35	00 35			03 19
	05	255 51.2	44.5	57 06.8	6.8	23 50.1	8.9 58.5	60	00 59	02 43	03 40	23 52	25 27	01 27		02 21
	06	270 51.2	N16 45.1	71 32.6	6.7	S23 59.0	8.8 58.5	N 58	01 41	03 00	03 52	23 24	24 50	00 50		01 47
	07	285 51.2	45.8	85 58.3	6.5	24 07.8	8.6 58.5	56	02 07	03 15	04 02	23 02	24 24	00 24		01 23
	08	300 51.3	46.5	100 23.8	6.5	24 16.4	8.5 58.5	54	02 28	03 27	04 10	22 44	24 03	00 03		01 03
	09	315 51.3	47.2	114 49.3	6.4	24 24.9	8.4 58.5	52	02 44	03 38	04 18	22 29	23 46	24 46		00 46
	10	330 51.4	47.9	129 14.7	6.2	24 33.3	8.2 58.6	50	02 58	03 47	04 25	22 16	23 31	24 32		00 32
	11	345 51.4	48.6	143 39.9	6.2	24 41.5	8.1 58.6	45	03 25	04 07	04 40	21 49	23 01	24 02		00 02
	12	0 51.5	N16 49.3	158 05.1	6.0	S24 49.6	7.9 58.6	N 40	03 46	04 22	04 52	21 27	22 37	23 39		24 31
	13	15 51.5	50.0	172 30.1	6.0	24 57.5	7.7 58.6	35	04 02	04 35	05 03	21 10	22 18	23 20		24 14
	14	30 51.5	50.7	186 55.1	5.9	25 05.2	7.7 58.6	30	04 15	04 46	05 12	20 55	22 02	23 04		23 59
	15	45 51.6	51.4	201 20.0	5.7	25 12.9	7.4 58.7	20	04 36	05 04	05 27	20 29	21 34	22 36		23 34
	16	60 51.6	52.0	215 44.7	5.7	25 20.3	7.3 58.7	N 10	04 53	05 19	05 41	20 07	21 10	22 13		23 12
	17	75 51.7	52.7	230 09.4	5.5	25 27.6	7.1 58.7	0	05 06	05 31	05 53	19 47	20 48	21 50		22 52
	18	90 51.7	N16 53.4	244 33.9	5.5	S25 34.7	7.0 58.7	S 10	05 18	05 43	06 05	19 26	20 26	21 28		22 32
	19	105 51.7	54.1	258 58.4	5.4	25 41.7	6.8 58.7	20	05 29	05 55	06 18	19 05	20 02	21 04		22 10
	20	120 51.8	54.8	273 22.8	5.3	25 48.5	6.7 58.7	30	05 39	06 08	06 33	18 40	19 34	20 37		21 45
	21	135 51.8	55.5	287 47.1	5.2	25 55.2	6.5 58.8	35	05 45	06 15	06 42	18 25	19 18	20 20		21 30
	22	150 51.9	56.2	302 11.3	5.1	26 01.7	6.3 58.8	40	05 50	06 23	06 51	18 08	18 59	20 01		21 12
	23	165 51.9	56.8	316 35.4	5.0	26 08.0	6.2 58.8	45	05 56	06 31	07 03	17 48	18 37	19 38		20 52
MONDAY	8 00	180 51.9	N16 57.5	330 59.4	5.0	S26 14.2	6.0 58.8	S 50	06 03	06 42	07 16	17 23	18 08	19 09		20 25
	01	195 52.0	58.2	345 23.4	4.8	26 20.2	5.8 58.8	52	06 05	06 46	07 23	17 11	17 53	18 54		20 12
	02	210 52.0	58.9	359 47.2	4.8	26 26.0	5.6 58.8	54	06 08	06 51	07 30	16 57	17 37	18 37		19 57
	03	225 52.0	16 59.6	14 11.0	4.7	26 31.6	5.5 58.8	56	06 11	06 57	07 38	16 41	17 18	18 17		19 40
	04	240 52.1	17 00.3	28 34.7	4.6	26 37.1	5.3 58.9	58	06 15	07 03	07 47	16 22	16 53	17 52		19 19
	05	255 52.1	00.9	42 58.3	4.5	26 42.4	5.1 58.9	S 60	06 18	07 09	07 57	15 59	16 22	17 17		18 52
	06	270 52.2	N17 01.6	57 21.8	4.5	S26 47.5	5.0 58.9	Lat.	Sunset	Twilight		Moonset				
	07	285 52.2	02.3	71 45.3	4.4	26 52.5	4.8 58.9			Civil	Naut.	7	8	9	10	
	08	300 52.2	03.0	86 08.7	4.3	26 57.3	4.6 58.9	°	h m	h m	h m	h m	h m	h m	h m	h m
	09	315 52.3	03.7	100 32.0	4.3	27 01.9	4.4 58.9									
	10	330 52.3	04.3	114 55.3	4.2	27 06.3	4.2 58.9	N 72								
	11	345 52.3	05.0	129 18.5	4.1	27 10.5	4.1 59.0	N 70	22 11	///	///					
	12	0 52.4	N17 05.7	143 41.6	4.1	S27 14.6	3.9 59.0	68	21 32	///	///					
	13	15 52.4	06.4	158 04.7	4.0	27 18.5	3.7 59.0	66	21 05	22 56	///	01 54				
	14	30 52.4	07.1	172 27.7	4.0	27 22.2	3.5 59.0	64	20 44	22 05	///	02 51				
	15	45 52.5	07.7	186 50.7	3.9	27 25.7	3.3 59.0	62	20 28	21 35	///	03 25	03 20			04 57
	16	60 52.5	08.4	201 13.6	3.8	27 29.0	3.2 59.0	60	20 14	21 13	23 02	03 50	04 02	04 37		05 55
	17	75 52.5	09.1	215 36.4	3.8	27 32.2	2.9 59.0	N 58	20 03	20 55	22 17	04 09	04 31	05 14		06 28
	18	90 52.6	10.4	229 59.2	3.7	S27 35.1	2.8 59.0	56	19 53	20 40	21 49	04 26	04 53	05 40		06 52
	19	105 52.6	11.1	244 21.9	3.7	27 37.9	2.6 59.1	54	19 44	20 27	21 28	04 40	05 12	06 01		07 12
	20	120 52.6	11.8	258 44.6	3.6	27 40.5	2.3 59.1	52	19 36	20 17	21 11	04 52	05 27	06 18		07 28
	21	135 52.7	12.5	273 07.3	3.6	27 42.8	2.2 59.1	50	19 29	20 07	20 57	05 03	05 41	06 33		07 43
	22	150 52.7	13.1	287 29.9	3.6	27 45.0	2.1 59.1	45	19 14	19 47	20 29	05 26	06 08	07 03		08 11
	23	165 52.7	13.1	301 52.5	3.6	27 47.1	1.8 59.1	N 40	19 01	19 31	20 08	05 45	06 30	07 27		08 34
	TUESDAY	9 00	180 52.8	N17 13.8	316 15.1	3.5	S27 48.9	1.6 59.1	35	18 51	19 18	19 52	06 00	06 49	07 46	
01		195 52.8	14.5	330 37.6	3.5	27 50.5	1.4 59.1	30	18 42	19 07	19 38	06 14	07 04	08 03		09 09
02		210 52.8	15.1	345 00.1	3.4	27 51.9	1.3 59.1	20	18 26	18 49	19 17	06 37	07 31	08 31		09 36
03		225 52.9	15.8	359 22.5	3.5	27 53.2	1.0 59.1	N 10	18 13	18 35	19 00	06 57	07 54	08 55		09 59
04		240 52.9	16.5	13 45.0	3.4	27 54.2	0.9 59.1	0	18 00	18 22	18 47	07 16	08 15	09 18		10 20
05		255 52.9	17.2	28 07.4	3.4	27 55.1	0.7 59.2	S 10	17 48	18 09	18 35	07 35	08 37	09 40		10 42
06		270 53.0	N17 17.8	42 29.8	3.4	S27 55.8	0.4 59.2	20	17 34	17 57	18 24	07 55	09 00	10 04		11 04
07		285 53.0	18.5	56 52.2	3.3	27 56.2	0.3 59.2	30	17 20	17 45	18 13	08 19	09 27	10 32		11 31
08		300 53.0	19.2	71 14.5	3.4	27 56.5	0.1 59.2	35	17 11	17 38	18 08	08 33	09 43	10 48		11 46
09		315 53.1	19.8	85 36.9	3.3	27 56.6	0.1 59.2	40	17 01	17 30	18 02	08 49	10 01	11 08		12 04
10		330 53.1	20.5	99 59.2	3.4	27 56.5	0.3 59.2	45	16 50	17 21	17 56	09 08	10 23	11 31		12 26
11		345 53.1	21.2	114 21.6	3.3	27 56.2	0.5 59.2	S 50	16 36	17 11	17 50	09 32	10 52	12 00		12 53
12		0 53.1	N17 21.8	128 43.9	3.3	S27 55.7	0.7 59.2	52	16 30	17 06	17 47	09 44	11 06	12 15		13 06
13		15 53.2	22.5	143 06.2	3.4	27 55.0	0.9 59.2	54	16 23	17 01	17 44	09 57	11 22	12 32		13 21
14		30 53.2	23.2	157 28.6	3.3	27 54.1	1.0 59.2	56	16 15	16 56	17 41	10 13	11 41	12 52		13 39
15		45 53.2	23.8	171 50.9	3.4	27 53.1	1.3 59.2	58	16 06	16 50	17 37	10 31	12 05	13 18		14 01
16	60 53.3	24.5	186 13.3	3.4	27 51.8	1.5 59.2	S 60	15 56	16 43	17 34	10 54	12 37	13 52		14 28	
17	75 53.3	25.2	200 35.6	3.4	27 50.3	1.6 59.3	Day	SUN			MOON					
18	90 53.3	N17 25.8	214 58.0	3.4	S27 48.7	1.9 59.3		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase			
19	105 53.3	26.5	229 20.4	3.4	27 46.8	2.0 59.3		00 ^h	12 ^h	Pass.	Upper	Lower	d	%		
20	120 53.4	27.1	243 42.8	3.5	27 44.8	2.3 59.3		03 24	03 26	11 57	01 03	13 31				

UT	ARIES		VENUS −4.2		MARS +1.4		JUPITER −2.1		SATURN +0.9		STARS		
	GHA		GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
WEDNESDAY	d h	° /	° /	° /	° /	° /	° /	° /	° /	° /		° /	° /
	00	227 32.2	134 36.9 N26 05.2	111 21.0 N22 57.7	200 43.2 N 9 55.6	249 12.7 S10 39.0	Acamar	315 13.3 S40 12.7					
	01	242 34.7	149 36.4 05.2	126 21.9 57.4	215 45.1 55.8	264 15.1 38.9	Achernar	335 21.8 S57 07.1					
	02	257 37.2	164 35.8 05.2	141 22.9 57.2	230 47.1 56.0	279 17.4 38.9	Acrux	173 01.1 S63 13.9					
	03	272 39.6	179 35.2 . . 05.1	156 23.9 . . 56.9	245 49.0 . . 56.2	294 19.7 . . 38.8	Adhara	255 07.2 S29 00.4					
	04	287 42.1	194 34.6 05.1	171 24.9 56.6	260 50.9 56.4	309 22.0 38.8	Aldebaran	290 41.6 N16 33.3					
	05	302 44.6	209 34.1 05.1	186 25.8 56.4	275 52.8 56.6	324 24.3 38.7							
	06	317 47.0	224 33.5 N26 05.1	201 26.8 N22 56.1	290 54.7 N 9 56.8	339 26.7 S10 38.7	Alioth	166 13.7 N55 50.2					
	07	332 49.5	239 32.9 05.1	216 27.8 55.8	305 56.6 57.0	354 29.0 38.6	Alkaid	152 52.7 N49 11.9					
	08	347 51.9	254 32.4 05.1	231 28.8 55.5	320 58.5 57.2	9 31.3 38.6	Alnair	27 34.7 S46 50.8					
	09	2 54.4	269 31.8 . . 05.1	246 29.7 . . 55.3	336 00.4 . . 57.4	24 33.6 . . 38.5	Alnilam	275 39.4 S 1 11.3					
	10	17 56.9	284 31.2 05.1	261 30.7 55.0	351 02.3 57.6	39 35.9 38.5	Alphard	217 49.1 S 8 45.7					
	11	32 59.3	299 30.7 05.1	276 31.7 54.7	6 04.3 57.8	54 38.2 38.4							
	12	48 01.8	314 30.1 N26 05.1	291 32.7 N22 54.5	21 06.2 N 9 58.0	69 40.6 S10 38.4	Alphecca	126 04.6 N26 38.1					
	13	63 04.3	329 29.6 05.0	306 33.6 54.2	36 08.1 58.3	84 42.9 38.3	Alpheratz	357 36.5 N29 12.9					
	14	78 06.7	344 29.0 05.0	321 34.6 53.9	51 10.0 58.5	99 45.2 38.3	Altair	62 01.2 N 8 55.6					
	15	93 09.2	359 28.4 . . 05.0	336 35.6 . . 53.6	66 11.9 . . 58.7	114 47.5 . . 38.2	Ankaa	353 08.8 S42 10.7					
	16	108 11.7	14 27.9 05.0	351 36.6 53.4	81 13.8 58.9	129 49.8 38.2	Antares	112 17.2 S26 29.0					
	17	123 14.1	29 27.3 05.0	6 37.5 53.1	96 15.7 59.1	144 52.2 38.1							
	18	138 16.6	44 26.7 N26 04.9	21 38.5 N22 52.8	111 17.6 N 9 59.3	159 54.5 S10 38.1	Arcturus	145 48.9 N19 03.6					
	19	153 19.1	59 26.2 04.9	36 39.5 52.5	126 19.6 59.5	174 56.8 38.0	Atria	107 12.2 S69 04.0					
	20	168 21.5	74 25.6 04.9	51 40.5 52.3	141 21.5 59.7	189 59.1 38.0	Avior	234 15.5 S59 35.3					
	21	183 24.0	89 25.1 . . 04.9	66 41.4 . . 52.0	156 23.4 9 59.9	205 01.4 . . 38.0	Bellatrix	278 24.7 N 6 22.2					
	22	198 26.4	104 24.5 04.8	81 42.4 51.7	171 25.3 10 00.1	220 03.8 37.9	Betelgeuse	270 53.9 N 7 24.6					
	23	213 28.9	119 23.9 04.8	96 43.4 51.5	186 27.2 00.3	235 06.1 37.9							
THURSDAY	00	228 31.4	134 23.4 N26 04.8	111 44.3 N22 51.2	201 29.1 N10 00.5	250 08.4 S10 37.8	Canopus	263 53.4 S52 42.7					
	01	243 33.8	149 22.8 04.8	126 45.3 50.9	216 31.0 00.7	265 10.7 37.8	Capella	280 24.4 N46 01.3					
	02	258 36.3	164 22.3 04.7	141 46.3 50.6	231 32.9 00.9	280 13.1 37.7	Deneb	49 26.7 N45 21.5					
	03	273 38.8	179 21.7 . . 04.7	156 47.3 . . 50.4	246 34.8 . . 01.1	295 15.4 . . 37.7	Denebola	182 26.2 N14 26.5					
	04	288 41.2	194 21.1 04.7	171 48.2 50.1	261 36.8 01.3	310 17.7 37.6	Diphda	348 49.0 S17 51.6					
	05	303 43.7	209 20.6 04.6	186 49.2 49.8	276 38.7 01.5	325 20.0 37.6							
	06	318 46.2	224 20.0 N26 04.6	201 50.2 N22 49.5	291 40.6 N10 01.7	340 22.3 S10 37.5	Dubhe	193 42.4 N61 37.8					
	07	333 48.6	239 19.5 04.6	216 51.2 49.2	306 42.5 01.9	355 24.7 37.5	Elnath	278 04.0 N28 37.6					
	08	348 51.1	254 18.9 04.5	231 52.1 49.0	321 44.4 02.1	10 27.0 37.4	Eltanin	90 42.4 N51 28.9					
	09	3 53.6	269 18.4 . . 04.5	246 53.1 . . 48.7	336 46.3 . . 02.3	25 29.3 . . 37.4	Enif	33 40.2 N 9 58.7					
	10	18 56.0	284 17.8 04.5	261 54.1 48.4	351 48.2 02.5	40 31.6 37.3	Fomalhaut	15 16.2 S29 29.9					
	11	33 58.5	299 17.3 04.4	276 55.1 48.1	6 50.2 02.8	55 33.9 37.3							
	12	49 00.9	314 16.7 N26 04.4	291 56.0 N22 47.9	21 52.1 N10 03.0	70 36.3 S10 37.3	Gacrux	171 52.8 S57 14.8					
	13	64 03.4	329 16.2 04.3	306 57.0 47.6	36 54.0 03.2	85 38.6 37.2	Gienah	175 44.8 S17 40.4					
	14	79 05.9	344 15.6 04.3	321 58.0 47.3	51 55.9 03.4	100 40.9 37.2	Hadar	148 37.4 S60 29.2					
	15	94 08.3	359 15.0 . . 04.2	336 59.0 . . 47.0	66 57.8 . . 03.6	115 43.2 . . 37.1	Hamal	327 53.1 N23 34.2					
	16	109 10.8	14 14.5 04.2	351 59.9 46.8	81 59.7 03.8	130 45.6 37.1	Kaus Aust.	83 34.1 S34 22.4					
	17	124 13.3	29 13.9 04.1	7 00.9 46.5	97 01.6 04.0	145 47.9 37.0							
	18	139 15.7	44 13.4 N26 04.1	22 01.9 N22 46.2	112 03.5 N10 04.2	160 50.2 S10 37.0	Kochab	137 18.6 N74 03.6					
	19	154 18.2	59 12.8 04.0	37 02.8 45.9	127 05.5 04.4	175 52.5 36.9	Markab	13 31.4 N15 19.6					
	20	169 20.7	74 12.3 04.0	52 03.8 45.6	142 07.4 04.6	190 54.9 36.9	Menkar	314 07.9 N 4 10.8					
	21	184 23.1	89 11.7 . . 03.9	67 04.8 . . 45.4	157 09.3 . . 04.8	205 57.2 . . 36.8	Menkent	147 58.9 S36 29.2					
	22	199 25.6	104 11.2 03.9	82 05.8 45.1	172 11.2 05.0	220 59.5 36.8	Miaplacidus	221 38.6 S69 49.0					
	23	214 28.0	119 10.6 03.8	97 06.7 44.8	187 13.1 05.2	236 01.8 36.7							
	FRIDAY	00	229 30.5	134 10.1 N26 03.8	112 07.7 N22 44.5	202 15.0 N10 05.4	251 04.2 S10 36.7	Mirfak	308 30.8 N49 56.5				
01		244 33.0	149 09.6 03.7	127 08.7 44.2	217 16.9 05.6	266 06.5 36.7	Nunki	75 49.3 S26 16.0					
02		259 35.4	164 09.0 03.7	142 09.7 44.0	232 18.8 05.8	281 08.8 36.6	Peacock	53 07.8 S56 39.4					
03		274 37.9	179 08.5 . . 03.6	157 10.6 . . 43.7	247 20.8 . . 06.0	296 11.1 . . 36.6	Pollux	243 19.2 N27 58.3					
04		289 40.4	194 07.9 03.6	172 11.6 43.4	262 22.7 06.2	311 13.5 36.5	Procyon	244 52.5 N 5 09.9					
05		304 42.8	209 07.4 03.5	187 12.6 43.1	277 24.6 06.4	326 15.8 36.5							
06		319 45.3	224 06.8 N26 03.4	202 13.6 N22 42.8	292 26.5 N10 06.6	341 18.1 S10 36.4	Rasalhague	95 59.6 N12 32.4					
07		334 47.8	239 06.3 03.4	217 14.5 42.6	307 28.4 06.8	356 20.4 36.4	Regulus	207 35.9 N11 51.2					
08		349 50.2	254 05.7 03.3	232 15.5 42.3	322 30.3 07.0	11 22.8 36.3	Rigel	281 05.5 S 8 10.6					
09		4 52.7	269 05.2 . . 03.2	247 16.5 . . 42.0	337 32.2 . . 07.2	26 25.1 . . 36.3	Rigel Kent.	139 41.6 S60 55.9					
10		19 55.2	284 04.6 03.2	262 17.4 41.7	352 34.2 07.4	41 27.4 36.2	Sabik	102 04.1 S15 45.3					
11		34 57.6	299 04.1 03.1	277 18.4 41.4	7 36.1 07.6	56 29.7 36.2							
12		50 00.1	314 03.6 N26 03.0	292 19.4 N22 41.1	22 38.0 N10 07.8	71 32.1 S10 36.2	Schedar	349 33.1 N56 39.6					
13		65 02.5	329 03.0 03.0	307 20.4 40.9	37 39.9 08.0	86 34.4 36.1	Shaula	96 11.9 S37 07.2					
14		80 05.0	344 02.5 02.9	322 21.3 40.6	52 41.8 08.2	101 36.7 36.1	Sirius	258 27.7 S16 45.0					
15		95 07.5	359 01.9 . . 02.8	337 22.3 . . 40.3	67 43.7 . . 08.4	116 39.0 . . 36.0	Spica	158 23.5 S11 17.1					
16		110 09.9	14 01.4 02.8	352 23.3 40.0	82 45.6 08.6	131 41.4 36.0	Suhail	222 47.4 S43 31.8					
17		125 12.4	29 00.9 02.7	7 24.3 39.7	97 47.6 08.9	146 43.7 35.9							
18		140 14.9	44 00.3 N26 02.6	22 25.2 N22 39.4	112 49.5 N10 09.1	161 46.0 S10 35.9	Vega	80 33.9 N38 48.0					
19		155 17.3	58 59.8 02.5	37 26.2 39.2	127 51.4 09.3	176 48.3 35.8	Zuben'ubi	136 57.2 S16 08.4					
20		170 19.8	73 59.2 02.5	52 27.2 38.9	142 53.3 09.5	191 50.7 35.8							
21		185 22.3	88 58.7 . . 02.4	67 28.2 . . 38.6	157 55.2 . . 09.7	206 53.0 . . 35.8							
22		200 24.7	103 58.2 02.3	82 29.1 38.3	172 57.1 09.9	221 55.3 35.7							
23		215 27.2	118 57.6 02.2	97 30.1 38.0	187 59.0 10.1	236 57.7 35.7							
h m								SHA	Mer.Pass.				
Mer.Pass. 8 44.5		v −0.6 d 0.0	v 1.0 d 0.3	v 1.9 d 0.2	v 2.3 d 0.0								
								Venus	265 52.0 h 15 03 m				
								Mars	243 13.0 16 32				
								Jupiter	332 57.7 10 33				
								Saturn	21 37.0 7 18				

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	10	11	12	13
d h	° / °	° / °	° / °	° / °	° / °	° / °	° / °	N 72	h m	h m	h m	h m	h m	h m	h m	h m	
10	00	180 53.5	N17 29.8	301 12.7	3.5	S27 34.7	3.0	59.3	N 70								
	01	195 53.5	30.4	315 35.2	3.6	27 31.7	3.2	59.3	N 70	////	////	01 26				04 22	
	02	210 53.5	31.1	329 57.8	3.6	27 28.5	3.4	59.3	68	////	////	02 10			04 53	03 55	
	03	225 53.6	31.8	344 20.4	3.7	27 25.1	3.6	59.3	66	////	00 30	02 39			04 03	03 34	
	04	240 53.6	32.4	358 43.1	3.7	27 21.5	3.7	59.3	64	////	01 36	03 01		04 02	03 32	03 18	
WEDNESDAY	05	255 53.6	33.1	13 05.8	3.7	27 17.8	4.0	59.3	62	////	02 09	03 18	03 19	03 12	03 08	03 04	
	06	270 53.6	N17 33.7	27 28.5	3.8	S27 13.8	4.1	59.3	60	00 26	02 33	03 33	02 21	02 41	02 49	02 52	
	07	285 53.7	34.4	41 51.3	3.8	27 09.7	4.3	59.3	N 58	01 26	02 52	03 45	01 47	02 18	02 33	02 42	
	08	300 53.7	35.1	56 14.1	3.8	27 05.4	4.5	59.3	56	01 56	03 07	03 56	01 23	01 58	02 19	02 33	
	09	315 53.7	35.7	70 36.9	4.0	27 00.9	4.7	59.3	54	02 19	03 21	04 05	01 03	01 42	02 08	02 25	
	10	330 53.7	36.4	84 59.9	3.9	26 56.2	4.9	59.3	52	02 37	03 32	04 13	00 46	01 28	01 57	02 17	
	11	345 53.7	37.0	99 22.8	4.1	26 51.3	5.0	59.3	50	02 51	03 42	04 20	00 32	01 16	01 48	02 11	
	12	0 53.8	N17 37.7	113 45.9	4.1	S26 46.3	5.3	59.3	45	03 20	04 03	04 36	00 02	00 51	01 28	01 57	
	13	15 53.8	38.3	128 09.0	4.1	26 41.0	5.4	59.3	N 40	03 42	04 19	04 49	24 31	00 31	01 12	01 45	
	14	30 53.8	39.0	142 32.1	4.2	26 35.6	5.6	59.3	35	03 59	04 32	05 00	24 14	00 14	00 58	01 35	
	15	45 53.8	39.6	156 55.3	4.3	26 30.0	5.8	59.4	30	04 13	04 44	05 10	23 59	24 46	00 46	01 26	
	16	60 53.9	40.3	171 18.6	4.3	26 24.2	5.9	59.4	20	04 35	05 02	05 26	23 34	24 25	00 25	01 11	
	17	75 53.9	40.9	185 41.9	4.5	26 18.3	6.2	59.4	N 10	04 52	05 18	05 40	23 12	24 07	00 07	00 58	
	18	90 53.9	N17 41.6	200 05.4	4.4	S26 12.1	6.3	59.4	0	05 06	05 31	05 53	22 52	23 51	24 45	00 45	
	19	105 53.9	42.2	214 28.8	4.6	26 05.8	6.5	59.4	S 10	05 18	05 44	06 06	22 32	23 34	24 32	00 32	
	20	120 53.9	42.9	228 52.4	4.6	25 59.3	6.6	59.4	20	05 30	05 56	06 20	22 10	23 15	24 19	00 19	
	21	135 54.0	43.5	243 16.0	4.7	25 52.7	6.8	59.4	30	05 41	06 10	06 35	21 45	22 54	24 03	00 03	
	22	150 54.0	44.2	257 39.7	4.8	25 45.9	7.0	59.4	35	05 47	06 17	06 44	21 30	22 42	23 54	25 04	
	23	165 54.0	44.8	272 03.5	4.8	25 38.9	7.2	59.4	40	05 53	06 25	06 54	21 12	22 28	23 44	24 57	
	THURSDAY	00	180 54.0	N17 45.5	286 27.3	4.9	S25 31.7	7.3	59.4	45	05 59	06 35	07 06	20 52	22 11	23 31	24 50
		01	195 54.0	46.1	300 51.2	5.1	25 24.4	7.6	59.4	S 50	06 06	06 45	07 21	20 25	21 50	23 16	24 41
		02	210 54.1	46.8	315 15.3	5.0	25 16.8	7.6	59.4	52	06 09	06 50	07 27	20 12	21 40	23 09	24 36
		03	225 54.1	47.4	329 39.3	5.2	25 09.2	7.9	59.4	54	06 13	06 56	07 35	19 57	21 28	23 01	24 32
		04	240 54.1	48.1	344 03.5	5.3	25 01.3	8.0	59.4	56	06 16	07 02	07 43	19 40	21 15	22 52	24 27
		05	255 54.1	48.7	358 27.8	5.3	24 53.3	8.1	59.4	58	06 20	07 08	07 53	19 19	21 00	22 42	24 21
06		270 54.1	N17 49.4	12 52.1	5.4	S24 45.2	8.3	59.4	S 60	06 24	07 15	08 04	18 52	20 42	22 31	24 14	
07		285 54.2	50.0	27 16.5	5.5	24 36.9	8.5	59.4	Lat.	Sunset	Twilight		Moonset				
08		300 54.2	50.6	41 41.0	5.6	24 28.4	8.6	59.4			Civil	Naut.	10	11	12	13	
09		315 54.2	51.3	56 05.6	5.7	24 19.8	8.8	59.4									
10		330 54.2	51.9	70 30.3	5.8	24 11.0	9.0	59.4									
11		345 54.2	52.6	84 55.1	5.9	24 02.0	9.1	59.4	N 72								
12		0 54.2	N17 53.2	99 20.0	5.9	S23 52.9	9.2	59.4	N 70	22 35	////	////				09 22	
13		15 54.3	53.9	113 44.9	6.1	23 43.7	9.4	59.4	68	21 47	////	////				09 58	
14		30 54.3	54.5	128 10.0	6.1	23 34.3	9.6	59.4	70	21 17	////	////			07 33	10 23	
15		45 54.3	55.1	142 35.1	6.3	23 24.7	9.7	59.4	66	21 17	////	////			08 22	10 42	
16		60 54.3	55.8	157 00.4	6.3	23 15.0	9.8	59.4	64	20 54	22 22	////		06 22	08 52	10 57	
17		75 54.3	56.4	171 25.7	6.4	23 05.2	10.0	59.4	62	20 36	21 47	////	04 57	07 11	09 15	11 09	
18		90 54.3	N17 57.1	185 51.1	6.6	S22 55.2	10.1	59.4	60	20 22	21 22	////	05 55	07 42	09 33	11 20	
19		105 54.4	57.7	200 16.7	6.6	22 45.1	10.3	59.4	N 58	20 09	21 03	22 32	06 28	08 05	09 48	11 29	
20		120 54.4	58.3	214 42.3	6.7	22 34.8	10.4	59.4	56	19 59	20 47	21 59	06 52	08 23	10 01	11 37	
21		135 54.4	59.0	229 08.0	6.8	22 24.4	10.5	59.3	54	19 49	20 34	21 36	07 12	08 39	10 12	11 44	
22		150 54.4	17 59.6	243 33.8	6.9	22 13.9	10.7	59.3	52	19 41	20 22	21 18	07 28	08 52	10 22	11 51	
23		165 54.4	18 00.2	257 59.7	7.0	22 03.2	10.8	59.3	50	19 33	20 12	21 03	07 43	09 04	10 31	11 57	
FRIDAY		00	180 54.4	N18 00.9	272 25.7	7.1	S21 52.4	10.9	59.3	45	19 17	19 51	20 34	08 11	09 29	10 49	12 09
	01	195 54.4	01.5	286 51.8	7.2	21 41.5	11.1	59.3	N 40	19 04	19 35	20 12	08 34	09 48	11 04	12 19	
	02	210 54.5	02.1	301 18.0	7.3	21 30.4	11.2	59.3	35	18 53	19 21	19 55	08 53	10 04	11 17	12 28	
	03	225 54.5	02.8	315 44.3	7.4	21 19.2	11.3	59.3	30	18 44	19 10	19 41	09 09	10 18	11 27	12 35	
	04	240 54.5	03.4	330 10.7	7.5	21 07.9	11.5	59.3	20	18 27	18 51	19 18	09 36	10 41	11 46	12 48	
	05	255 54.5	04.0	344 37.2	7.6	20 56.4	11.5	59.3	N 10	18 13	18 35	19 01	09 59	11 02	12 02	12 59	
	06	270 54.5	N18 04.7	359 03.8	7.6	S20 44.9	11.7	59.3	0	18 00	18 22	18 47	10 20	11 20	12 17	13 09	
	07	285 54.5	05.3	13 30.4	7.8	20 33.2	11.8	59.3	S 10	17 47	18 09	18 34	10 42	11 39	12 32	13 20	
	08	300 54.5	05.9	27 57.2	7.9	20 21.4	12.0	59.3	20	17 33	17 56	18 23	11 04	11 59	12 47	13 31	
	09	315 54.5	06.6	42 24.1	8.0	20 09.4	12.0	59.3	30	17 17	17 43	18 11	11 31	12 22	13 05	13 43	
	10	330 54.6	07.2	56 51.1	8.0	19 57.4	12.2	59.3	35	17 08	17 35	18 06	11 46	12 35	13 16	13 50	
	11	345 54.6	07.8	71 18.1	8.2	19 45.2	12.3	59.3	40	16 58	17 27	17 59	12 04	12 50	13 27	13 58	
	12	0 54.6	N18 08.5	85 45.3	8.3	S19 32.9	12.4	59.3	45	16 46	17 18	17 53	12 26	13 08	13 41	14 07	
	13	15 54.6	09.1	100 12.6	8.3	19 20.5	12.5	59.3	S 50	16 31	17 07	17 46	12 53	13 31	13 58	14 18	
	14	30 54.6	09.7	114 39.9	8.5	19 08.0	12.6	59.3	52	16 25	17 02	17 43	13 06	13 41	14 06	14 23	
	15	45 54.6	10.3	129 07.4	8.5	18 55.4	12.7	59.3	54	16 17	16 56	17 39	13 21	13 53	14 14	14 29	
	16	60 54.6	11.0	143 34.9	8.7	18 42.7	12.8	59.3	56	16 09	16 51	17 36	13 39	14 07	14 24	14 35	
	17	75 54.6	11.6	158 02.6	8.7	18 29.9	13.0	59.3	58	15 59	16 44	17 32	14 01	14 23	14 35	14 42	
	18	90 54.6	N18 12.2	172 30.3	8.8	S18 16.9	13.0	59.3	S 60	15 48	16 37	17 28	14 28	14 42	14 48	14 50	
	19	105 54.6	12.9	186 58.1	8.9	18 03.9	13.1	59.3	SUN		MOON						
	20	120 54.7	13.5	201 26.0	9.0	17 50.8	13.2	59.3	Day	Eqn. of Time	Mer.	Mer. Pass.	Age	Phase			
	21	135 54.7	14.1	215 54.0	9.1	17 37.6	13.4	59.2		00 ^h 12 ^h	Pass.	Upper	Lower	d	%		
	22	150 54.7	14.7	230 22.1	9.2	17 24.2	13.4	59.2	d	m s	m s	h					

UT	ARIES		VENUS −4.2		MARS +1.5		JUPITER −2.1		SATURN +0.8		STARS		
	GHA	GHA Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
SATURDAY	13 ^d 00 ^h	230 29.7	133 57.1 N26 02.1	112 31.1 N22 37.7	203 01.0 N10 10.3	252 00.0 S10 35.6	Acamar	315 13.3	S40 12.7				
	01	245 32.1	148 56.6 02.1	127 32.0 37.4	218 02.9 10.5	267 02.3 35.6	Achernar	335 21.7	S57 07.0				
	02	260 34.6	163 56.0 02.0	142 33.0 37.2	233 04.8 10.7	282 04.6 35.5	Acrux	173 01.1	S63 13.9				
	03	275 37.0	178 55.5 . . 01.9	157 34.0 . . 36.9	248 06.7 . . 10.9	297 07.0 . . 35.5	Adhara	255 07.2	S29 00.4				
	04	290 39.5	193 55.0 01.8	172 35.0 36.6	263 08.6 11.1	312 09.3 35.4	Aldebaran	290 41.6	N16 33.3				
	05	305 42.0	208 54.4 01.7	187 35.9 36.3	278 10.5 11.3	327 11.6 35.4							
	06	320 44.4	223 53.9 N26 01.6	202 36.9 N22 36.0	293 12.4 N10 11.5	342 13.9 S10 35.4	Alioth	166 13.8	N55 50.2				
	07	335 46.9	238 53.4 01.5	217 37.9 35.7	308 14.4 11.7	357 16.3 35.3	Alkaid	152 52.7	N49 11.9				
	08	350 49.4	253 52.8 01.4	232 38.9 35.4	323 16.3 11.9	12 18.6 35.3	Alnair	27 34.7	S46 50.7				
	09	5 51.8	268 52.3 . . 01.4	247 39.8 . . 35.2	338 18.2 . . 12.1	27 20.9 . . 35.2	Alnilam	275 39.4	S 1 11.3				
SUNDAY	10	20 54.3	283 51.8 01.3	262 40.8 34.9	353 20.1 12.3	42 23.3 35.2	Alphard	217 49.1	S 8 45.7				
	11	35 56.8	298 51.2 01.2	277 41.8 34.6	8 22.0 12.5	57 25.6 35.1							
	12	50 59.2	313 50.7 N26 01.1	292 42.7 N22 34.3	23 23.9 N10 12.7	72 27.9 S10 35.1	Alphecca	126 04.6	N26 38.1				
	13	66 01.7	328 50.2 01.0	307 43.7 34.0	38 25.8 12.9	87 30.3 35.0	Alpheratz	357 36.4	N29 12.9				
	14	81 04.1	343 49.6 00.9	322 44.7 33.7	53 27.8 13.1	102 32.6 35.0	Altair	62 01.2	N 8 55.6				
	15	96 06.6	358 49.1 . . 00.8	337 45.7 . . 33.4	68 29.7 . . 13.3	117 34.9 . . 35.0	Ankaa	353 08.8	S42 10.7				
	16	111 09.1	13 48.6 00.7	352 46.6 33.1	83 31.6 13.5	132 37.2 34.9	Antares	112 17.2	S26 29.0				
	17	126 11.5	28 48.1 00.6	7 47.6 32.8	98 33.5 13.7	147 39.6 34.9							
	18	141 14.0	43 47.5 N26 00.5	22 48.6 N22 32.6	113 35.4 N10 13.9	162 41.9 S10 34.8	Arcturus	145 48.9	N19 03.6				
	19	156 16.5	58 47.0 00.4	37 49.6 32.3	128 37.3 14.1	177 44.2 34.8	Atria	107 12.2	S69 04.1				
	20	171 18.9	73 46.5 00.3	52 50.5 32.0	143 39.3 14.3	192 46.6 34.7	Avior	234 15.5	S59 35.3				
	21	186 21.4	88 46.0 . . 00.2	67 51.5 . . 31.7	158 41.2 . . 14.5	207 48.9 . . 34.7	Bellatrix	278 24.7	N 6 22.2				
	22	201 23.9	103 45.4 00.1	82 52.5 31.4	173 43.1 14.7	222 51.2 34.7	Betelgeuse	270 53.9	N 7 24.6				
	23	216 26.3	118 44.9 26 00.0	97 53.4 31.1	188 45.0 14.9	237 53.6 34.6							
	MONDAY	14 ⁰⁰	231 28.8	133 44.4 N25 59.9	112 54.4 N22 30.8	203 46.9 N10 15.1	252 55.9 S10 34.6	Canopus	263 53.4	S52 42.6			
		01	246 31.3	148 43.9 59.7	127 55.4 30.5	218 48.8 15.3	267 58.2 34.5	Capella	280 24.4	N46 01.3			
		02	261 33.7	163 43.3 59.6	142 56.4 30.2	233 50.7 15.5	283 00.6 34.5	Deneb	49 26.6	N45 21.5			
		03	276 36.2	178 42.8 . . 59.5	157 57.3 . . 29.9	248 52.7 . . 15.7	298 02.9 . . 34.4	Denebola	182 26.2	N14 26.5			
		04	291 38.6	193 42.3 59.4	172 58.3 29.6	263 54.6 15.9	313 05.2 34.4	Diphda	348 48.9	S17 51.6			
		05	306 41.1	208 41.8 59.3	187 59.3 29.4	278 56.5 16.1	328 07.5 34.4						
		06	321 43.6	223 41.3 N25 59.2	203 00.3 N22 29.1	293 58.4 N10 16.3	343 09.9 S10 34.3	Dubhe	193 42.5	N61 37.8			
		07	336 46.0	238 40.7 59.1	218 01.2 28.8	309 00.3 16.5	358 12.2 34.3	Elnath	278 04.0	N28 37.6			
		08	351 48.5	253 40.2 58.9	233 02.2 28.5	324 02.2 16.7	13 14.5 34.2	Eltanin	90 42.4	N51 28.9			
		09	6 51.0	268 39.7 . . 58.8	248 03.2 . . 28.2	339 04.2 . . 16.9	28 16.9 . . 34.2	Enif	33 40.2	N 9 58.7			
10		21 53.4	283 39.2 58.7	263 04.1 27.9	354 06.1 17.1	43 19.2 34.1	Fomalhaut	15 16.2	S29 29.9				
11		36 55.9	298 38.7 58.6	278 05.1 27.6	9 08.0 17.3	58 21.5 34.1							
12		51 58.4	313 38.2 N25 58.5	293 06.1 N22 27.3	24 09.9 N10 17.5	73 23.9 S10 34.1	Gacrux	171 52.8	S57 14.8				
13		67 00.8	328 37.6 58.3	308 07.1 27.0	39 11.8 17.7	88 26.2 34.0	Gienah	175 44.8	S17 40.4				
14		82 03.3	343 37.1 58.2	323 08.0 26.7	54 13.7 17.9	103 28.5 34.0	Hadar	148 37.4	S60 29.2				
15		97 05.8	358 36.6 . . 58.1	338 09.0 . . 26.4	69 15.7 . . 18.1	118 30.9 . . 33.9	Hamal	327 53.1	N23 34.2				
16		112 08.2	13 36.1 58.0	353 10.0 26.1	84 17.6 18.3	133 33.2 33.9	Kaus Aust.	83 34.1	S34 22.4				
17		127 10.7	28 35.6 57.9	8 10.9 25.8	99 19.5 18.5	148 35.5 33.9							
18		142 13.1	43 35.1 N25 57.7	23 11.9 N22 25.5	114 21.4 N10 18.7	163 37.9 S10 33.8	Kochab	137 18.6	N74 03.6				
19		157 15.6	58 34.6 57.6	38 12.9 25.2	129 23.3 18.9	178 40.2 33.8	Markab	13 31.4	N15 19.6				
20		172 18.1	73 34.0 57.5	53 13.9 24.9	144 25.2 19.1	193 42.5 33.7	Menkar	314 07.9	N 4 10.8				
21		187 20.5	88 33.5 . . 57.3	68 14.8 . . 24.6	159 27.2 . . 19.3	208 44.9 . . 33.7	Menkent	147 58.9	S36 29.2				
22		202 23.0	103 33.0 57.2	83 15.8 24.4	174 29.1 19.5	223 47.2 33.6	Miaplacidus	221 38.7	S69 49.0				
23		217 25.5	118 32.5 57.1	98 16.8 24.1	189 31.0 19.7	238 49.5 33.6							
TUESDAY	15 ⁰⁰	232 27.9	133 32.0 N25 56.9	113 17.8 N22 23.8	204 32.9 N10 19.9	253 51.9 S10 33.6	Mirfak	308 30.8	N49 56.5				
	01	247 30.4	148 31.5 56.8	128 18.7 23.5	219 34.8 20.1	268 54.2 33.5	Nunki	75 49.2	S26 16.0				
	02	262 32.9	163 31.0 56.7	143 19.7 23.2	234 36.7 20.3	283 56.5 33.5	Peacock	53 07.7	S56 39.4				
	03	277 35.3	178 30.5 . . 56.5	158 20.7 . . 22.9	249 38.7 . . 20.5	298 58.9 . . 33.4	Pollux	243 19.2	N27 58.3				
	04	292 37.8	193 30.0 56.4	173 21.6 22.6	264 40.6 20.7	314 01.2 33.4	Procyon	244 52.5	N 5 09.9				
	05	307 40.2	208 29.5 56.3	188 22.6 22.3	279 42.5 20.9	329 03.6 33.4							
	06	322 42.7	223 29.0 N25 56.1	203 23.6 N22 22.0	294 44.4 N10 21.1	344 05.9 S10 33.3	Rasalhague	95 59.5	N12 32.4				
	07	337 45.2	238 28.4 56.0	218 24.6 21.7	309 46.3 21.3	359 08.2 33.3	Regulus	207 35.9	N11 51.2				
	08	352 47.6	253 27.9 55.8	233 25.5 21.4	324 48.2 21.5	14 10.6 33.2	Rigel	281 05.5	S 8 10.6				
	09	7 50.1	268 27.4 . . 55.7	248 26.5 . . 21.1	339 50.2 . . 21.7	29 12.9 . . 33.2	Rigel Kent.	139 41.6	S60 55.9				
	10	22 52.6	283 26.9 55.5	263 27.5 20.8	354 52.1 21.9	44 15.2 33.1	Sabik	102 04.1	S15 45.3				
	11	37 55.0	298 26.4 55.4	278 28.4 20.5	9 54.0 22.1	59 17.6 33.1							
	12	52 57.5	313 25.9 N25 55.2	293 29.4 N22 20.2	24 55.9 N10 22.3	74 19.9 S10 33.1	Schedar	349 33.1	N56 39.6				
	13	68 00.0	328 25.4 55.1	308 30.4 19.9	39 57.8 22.5	89 22.2 33.0	Shaula	96 11.9	S37 07.2				
	14	83 02.4	343 24.9 54.9	323 31.4 19.6	54 59.7 22.7	104 24.6 33.0	Sirius	258 27.7	S16 45.0				
	15	98 04.9	358 24.4 . . 54.8	338 32.3 . . 19.3	70 01.7 . . 22.9	119 26.9 . . 32.9	Spica	158 23.5	S11 17.1				
	16	113 07.4	13 23.9 54.6	353 33.3 19.0	85 03.6 23.1	134 29.2 32.9	Suhail	222 47.4	S43 31.8				
	17	128 09.8	28 23.4 54.5	8 34.3 18.7	100 05.5 23.3	149 31.6 32.9							
	18	143 12.3	43 22.9 N25 54.3	23 35.3 N22 18.4	115 07.4 N10 23.5	164 33.9 S10 32.8	Vega	80 33.9	N38 48.1				
	19	158 14.7	58 22.4 54.2	38 36.2 18.1	130 09.3 23.7	179 36.3 32.8	Zuben'ubi	136 57.2	S16 08.4				
	20	173 17.2	73 21.9 54.0	53 37.2 17.8	145 11.3 23.9	194 38.6 32.7							
	21	188 19.7	88 21.4 . . 53.9	68 38.2 . . 17.5	160 13.2 . . 24.1	209 40.9 . . 32.7							
	22	203 22.1	103 20.9 53.7	83 39.1 17.2	175 15.1 24.3	224 43.3 32.7	Venus	262 15.6	15 06				
	23	218 24.6	118 20.4 53.6	98 40.1 16.9	190 17.0 24.5	239 45.6 32.6	Mars	241 25.6	16 27				
Mer. Pass. 8 32.7		v −0.5 d 0.1		v 1.0 d 0.3		v 1.9 d 0.2		v 2.3 d 0.0		Jupiter 332 18.1 10 24			
										Saturn 21 27.1 7 07			

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise					
										13	14		15	16				
	GHA	Dec	GHA	v	Dec	d	HP	Naut.							Civil	h m	h m	h m
d h	° / ' " /	° / ' " /	° / ' " /	° / ' " /	° / ' " /	° / ' " /	° / ' " /	°	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
SATURDAY	N 72	180 54.7	N18 16.0	259 18.6	9.4	S16 57.3	13.6	59.2	N 70	00 57	01 54	02 27	04 22	03 40	03 10	02 44		
	68	195 54.7	16.6	273 47.0	9.4	16 43.7	13.7	59.2	68	01 54	03 55	03 27	03 06	02 47	02 56	02 47		
	66	210 54.7	17.2	288 15.4	9.6	16 30.0	13.8	59.2	66	02 27	03 34	03 16	03 02	02 49	02 50	02 49		
	64	225 54.7	17.8	302 44.0	9.6	16 16.2	13.9	59.2	64	01 17	02 51	03 18	03 07	02 59	02 50	02 50		
	62	240 54.7	18.5	317 12.6	9.7	16 02.3	13.9	59.2	62	01 57	03 10	03 04	03 00	02 56	02 52	02 52		
	60	255 54.7	19.1	331 41.3	9.8	15 48.4	14.1	59.2	60	02 23	03 25	02 52	02 53	02 53	02 53	02 53		
	N 58	270 54.7	N18 19.7	346 10.1	9.9	S15 34.3	14.1	59.2	N 58	01 09	02 44	03 38	02 42	02 47	02 51	02 55		
	56	285 54.7	20.3	0 39.0	10.0	15 20.2	14.2	59.2	56	01 45	03 00	03 50	02 33	02 42	02 49	02 56		
	54	300 54.7	20.9	15 08.0	10.0	15 06.0	14.3	59.2	54	02 10	03 14	03 59	02 25	02 37	02 47	02 57		
	52	315 54.7	21.6	29 37.0	10.2	14 51.7	14.3	59.2	52	02 29	03 26	04 08	02 17	02 33	02 46	02 58		
	50	330 54.8	22.2	44 06.2	10.2	14 37.4	14.5	59.2	50	02 45	03 37	04 16	02 11	02 29	02 44	02 58		
	45	345 54.8	22.8	58 35.4	10.3	14 22.9	14.5	59.2	45	03 15	03 59	04 33	01 57	02 20	02 41	03 00		
	N 40	0 54.8	N18 23.4	73 04.7	10.3	S14 08.4	14.6	59.1	N 40	03 38	04 16	04 46	01 45	02 13	02 38	03 02		
	35	15 54.8	24.0	87 34.0	10.5	13 53.8	14.6	59.1	35	03 56	04 30	04 58	01 35	02 07	02 36	03 03		
	30	30 54.8	24.6	102 03.5	10.5	13 39.2	14.7	59.1	30	04 10	04 41	05 07	01 26	02 01	02 34	03 04		
	20	45 54.8	25.3	116 33.0	10.6	13 24.5	14.8	59.1	20	04 33	05 01	05 24	01 11	01 52	02 30	03 07		
	N 10	60 54.8	25.9	131 02.6	10.7	13 09.7	14.9	59.1	N 10	04 51	05 17	05 39	00 58	01 44	02 27	03 08		
	0	75 54.8	26.5	145 32.3	10.7	12 54.8	14.9	59.1	0	05 06	05 31	05 53	00 45	01 36	02 24	03 10		
	S 10	90 54.8	N18 27.1	160 02.0	10.9	S12 39.9	15.0	59.1	S 10	05 19	05 44	06 06	00 32	01 28	02 21	03 12		
	20	105 54.8	27.7	174 31.9	10.9	12 24.9	15.0	59.1	20	05 31	05 57	06 21	00 19	01 19	02 17	03 14		
	30	120 54.8	28.3	189 01.8	10.9	12 09.9	15.1	59.1	30	05 43	06 12	06 37	00 03	01 09	02 14	03 16		
	35	135 54.8	28.9	203 31.7	11.0	11 54.8	15.2	59.1	35	05 49	06 19	06 46	25 04	01 04	02 11	03 18		
	40	150 54.8	29.5	218 01.7	11.1	11 39.6	15.2	59.1	40	05 55	06 28	06 57	24 57	00 57	02 09	03 19		
	45	165 54.8	30.2	232 31.8	11.2	11 24.4	15.2	59.0	45	06 02	06 38	07 10	24 50	00 50	02 06	03 21		
	SUNDAY	S 50	180 54.8	N18 30.8	247 02.0	11.2	S11 09.2	15.4	59.0	S 50	06 10	06 49	07 25	24 41	00 41	02 03	03 23	
52		195 54.8	31.4	261 32.2	11.3	10 53.8	15.3	59.0	52	06 13	06 55	07 32	24 36	00 36	02 01	03 24		
54		210 54.8	32.0	276 02.5	11.4	10 38.5	15.5	59.0	54	06 17	07 00	07 40	24 32	00 32	02 00	03 25		
56		225 54.8	32.6	290 32.9	11.4	10 23.0	15.4	59.0	56	06 21	07 06	07 49	24 27	00 27	01 58	03 26		
58		240 54.8	33.2	305 03.3	11.5	10 07.6	15.5	59.0	58	06 25	07 13	07 59	24 21	00 21	01 55	03 28		
S 60		255 54.8	33.8	319 33.8	11.5	9 52.1	15.6	59.0	S 60	06 29	07 21	08 10	24 14	00 14	01 53	03 29		
N 40		270 54.8	N18 34.4	334 04.3	11.6	S 9 36.5	15.6	59.0	Lat.	Sunset	Twilight		Moonset					
35		285 54.8	35.0	348 34.9	11.7	9 20.9	15.7	59.0			Civil	Naut.	13	14	15	16		
30		300 54.8	35.6	3 05.6	11.7	9 05.2	15.7	59.0	°	h m	h m	h m	h m	h m	h m	h m	h m	
N 72		315 54.8	36.2	17 36.3	11.8	8 49.5	15.7	58.9	N 72	09 22	10 00	10 40	09 22	12 11	14 33	16 51		
N 70		330 54.8	36.8	32 07.1	11.8	8 33.8	15.8	58.9	N 70	23 07	23 45	24 25	09 58	12 24	14 34	16 42		
68		345 54.8	37.4	46 37.9	11.9	8 18.0	15.8	58.9	68	22 03	22 41	23 21	10 23	12 35	14 36	16 34		
66		0 54.8	N18 38.0	61 08.8	11.9	S 8 02.2	15.8	58.9	66	21 29	22 07	22 47	10 23	12 35	14 36	16 34		
64		15 54.8	38.6	75 39.7	11.9	7 46.4	15.9	58.9	64	21 04	21 42	22 22	10 57	12 50	14 38	16 23		
62		30 54.8	39.2	90 10.6	12.1	7 30.5	15.9	58.9	62	20 45	21 23	22 03	11 09	12 56	14 38	16 19		
60		45 54.8	39.9	104 41.7	12.0	7 14.6	15.9	58.9	60	20 29	21 07	21 47	11 20	13 02	14 39	16 15		
N 58		60 54.8	40.5	119 12.7	12.2	6 58.7	16.0	58.9	N 58	20 16	20 54	21 34	11 29	13 06	14 40	16 11		
56		75 54.8	41.1	133 43.9	12.1	6 42.7	16.0	58.9	56	20 04	20 42	21 22	11 37	13 10	14 40	16 09		
54		90 54.8	N18 41.7	148 15.0	12.2	S 6 26.7	16.0	58.8	54	19 54	20 32	21 12	11 44	13 14	14 40	16 06		
52		105 54.8	42.3	162 46.2	12.3	6 10.7	16.1	58.8	52	19 46	20 24	21 04	11 51	13 17	14 41	16 03		
50		120 54.8	42.9	177 17.5	12.2	5 54.6	16.0	58.8	50	19 38	20 16	20 56	11 57	13 20	14 41	16 01		
45		135 54.8	43.5	191 48.7	12.4	5 38.6	16.1	58.8	45	19 21	19 59	20 39	12 09	13 26	14 42	15 57		
40		150 54.8	44.0	206 20.1	12.3	5 22.5	16.1	58.8	N 40	19 07	19 45	20 25	12 19	13 32	14 43	15 53		
35		165 54.8	44.6	220 51.4	12.4	5 06.4	16.2	58.8	35	18 56	19 34	20 14	12 28	13 36	14 43	15 49		
MONDAY		N 40	180 54.8	N18 45.2	235 22.8	12.5	S 4 50.2	16.1	58.8	N 40	18 46	19 24	19 58	12 35	13 40	14 44	15 46	
	35	195 54.8	45.8	249 54.3	12.4	4 34.1	16.2	58.8	30	18 28	19 06	19 40	12 48	13 47	14 45	15 41		
	30	210 54.8	46.4	264 25.7	12.5	4 17.9	16.2	58.8	N 10	18 14	18 52	19 26	12 59	13 53	14 45	15 37		
	20	225 54.7	47.0	278 57.2	12.6	4 01.7	16.2	58.7	0	18 00	18 38	19 12	13 09	13 59	14 46	15 32		
	N 10	240 54.7	47.6	293 28.8	12.5	3 45.5	16.2	58.7	S 10	17 46	18 24	18 58	13 20	14 04	14 46	15 28		
	0	255 54.7	48.2	308 00.3	12.6	3 29.3	16.2	58.7	20	17 32	18 10	18 44	13 31	14 10	14 47	15 24		
	S 10	270 54.7	N18 48.8	322 31.9	12.6	S 3 13.1	16.2	58.7	30	17 15	17 53	18 27	13 43	14 16	14 48	15 18		
	20	285 54.7	49.4	337 03.5	12.7	2 56.9	16.2	58.7	35	17 06	17 44	18 18	13 50	14 20	14 48	15 16		
	30	300 54.7	50.0	351 35.2	12.7	2 40.7	16.3	58.7	40	16 55	17 33	18 07	13 58	14 24	14 49	15 12		
	35	315 54.7	50.6	6 06.9	12.7	2 24.4	16.2	58.7	45	16 43	17 21	17 55	14 07	14 29	14 49	15 08		
	N 40	330 54.7	51.2	20 38.6	12.7	2 08.2	16.3	58.6	S 50	16 27	17 05	17 39	14 18	14 35	14 50	15 04		
	45	345 54.7	51.8	35 10.3	12.7	1 51.9	16.2	58.6	52	16 20	16 58	17 32	14 23	14 38	14 50	15 02		
	S 50	0 54.7	N18 52.4	49 42.0	12.8	S 1 35.7	16.3	58.6	54	16 12	16 50	17 24	14 29	14 40	14 50	15 00		
	52	15 54.7	53.0	64 13.8	12.8	1 19.4	16.2	58.6	56	16 03	16 41	17 15	14 35	14 44	14 50	14 57		
	54	30 54.7	53.5	78 45.6	12.8	1 03.2	16.3	58.6	58	15 53	16 31	17 05	14 42	14 47	14 51	14 54		
	56	45 54.7	54.1	93 17.4	12.8	0 46.9	16.2	58.6	S 60	15 42	16 20	16 54	14 50	14 51	14 51	14 51		
	58	60 54.7	54.7	107 49.2	12.8	0 30.7	16.3	58.6										
	S 60	7																

UT	ARIES			VENUS -4.3			MARS +1.5			JUPITER -2.1			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		Name	SHA	Dec			
TUESDAY	00	233 27.1	133 19.9 N25 53.4	113 41.1 N22 16.6	205 18.9 N10 24.7	254 47.9 S10 32.6	Acamar	315 13.3	S40 12.7									
	01	248 29.5	148 19.5 53.2	128 42.1 16.3	220 20.8 24.9	269 50.3 32.5	Achernar	335 21.7	S57 07.0									
	02	263 32.0	163 19.0 53.1	143 43.0 16.0	235 22.8 25.1	284 52.6 32.5	Acrux	173 01.2	S63 13.9									
	03	278 34.5	178 18.5 . . 52.9	158 44.0 . . 15.7	250 24.7 . . 25.3	299 55.0 . . 32.5	Adhara	255 07.2	S29 00.4									
	04	293 36.9	193 18.0 52.7	173 45.0 15.4	265 26.6 25.5	314 57.3 32.4	Aldebaran	290 41.6	N16 33.3									
	05	308 39.4	208 17.5 52.6	188 45.9 15.1	280 28.5 25.7	329 59.6 32.4												
	06	323 41.8	223 17.0 N25 52.4	203 46.9 N22 14.8	295 30.4 N10 25.9	345 02.0 S10 32.3	Alioth	166 13.8	N55 50.2									
	07	338 44.3	238 16.5 52.2	218 47.9 14.4	310 32.4 26.1	0 04.3 32.3	Alkaid	152 52.7	N49 11.9									
	08	353 46.8	253 16.0 52.1	233 48.9 14.1	325 34.3 26.3	15 06.7 32.3	Alnair	27 34.7	S46 50.7									
	09	8 49.2	268 15.5 . . 51.9	248 49.8 . . 13.8	340 36.2 . . 26.5	30 09.0 . . 32.2	Alnilam	275 39.4	S 1 11.3									
	10	23 51.7	283 15.0 51.7	263 50.8 13.5	355 38.1 26.7	45 11.3 32.2	Alphard	217 49.2	S 8 45.7									
	11	38 54.2	298 14.5 51.6	278 51.8 13.2	10 40.0 26.9	60 13.7 32.1												
	12	53 56.6	313 14.1 N25 51.4	293 52.7 N22 12.9	25 42.0 N10 27.1	75 16.0 S10 32.1	Alphecca	126 04.6	N26 38.1									
	13	68 59.1	328 13.6 51.2	308 53.7 12.6	40 43.9 27.3	90 18.4 32.1	Alpheratz	357 36.4	N29 12.9									
	14	84 01.6	343 13.1 51.0	323 54.7 12.3	55 45.8 27.5	105 20.7 32.0	Altair	62 01.1	N 8 55.6									
	15	99 04.0	358 12.6 . . 50.9	338 55.7 . . 12.0	70 47.7 . . 27.7	120 23.0 . . 32.0	Ankaa	353 08.8	S42 10.7									
	16	114 06.5	13 12.1 50.7	353 56.6 11.7	85 49.6 27.9	135 25.4 31.9	Antares	112 17.2	S26 29.0									
	17	129 09.0	28 11.6 50.5	8 57.6 11.4	100 51.5 28.1	150 27.7 31.9												
	18	144 11.4	43 11.1 N25 50.3	23 58.6 N22 11.1	115 53.5 N10 28.3	165 30.1 S10 31.9	Arcturus	145 48.9	N19 03.7									
	19	159 13.9	58 10.7 50.2	38 59.5 10.8	130 55.4 28.5	180 32.4 31.8	Atria	107 12.1	S69 04.1									
	20	174 16.3	73 10.2 50.0	54 00.5 10.5	145 57.3 28.7	195 34.7 31.8	Avior	234 15.6	S59 35.3									
	21	189 18.8	88 09.7 . . 49.8	69 01.5 . . 10.2	160 59.2 . . 28.9	210 37.1 . . 31.7	Bellatrix	278 24.7	N 6 22.2									
	22	204 21.3	103 09.2 49.6	84 02.5 09.9	176 01.1 29.1	225 39.4 31.7	Betelgeuse	270 53.9	N 7 24.6									
	23	219 23.7	118 08.7 49.4	99 03.4 09.6	191 03.1 29.3	240 41.8 31.7												
WEDNESDAY	00	234 26.2	133 08.2 N25 49.2	114 04.4 N22 09.2	206 05.0 N10 29.5	255 44.1 S10 31.6	Canopus	263 53.4	S52 42.6									
	01	249 28.7	148 07.8 49.1	129 05.4 08.9	221 06.9 29.7	270 46.4 31.6	Capella	280 24.4	N46 01.3									
	02	264 31.1	163 07.3 48.9	144 06.3 08.6	236 08.8 29.9	285 48.8 31.6	Deneb	49 26.6	N45 21.5									
	03	279 33.6	178 06.8 . . 48.7	159 07.3 . . 08.3	251 10.7 . . 30.1	300 51.1 . . 31.5	Denebola	182 26.2	N14 26.6									
	04	294 36.1	193 06.3 48.5	174 08.3 08.0	266 12.7 30.3	315 53.5 31.5	Diphda	348 48.9	S17 51.6									
	05	309 38.5	208 05.9 48.3	189 09.3 07.7	281 14.6 30.5	330 55.8 31.4												
	06	324 41.0	223 05.4 N25 48.1	204 10.2 N22 07.4	296 16.5 N10 30.7	345 58.2 S10 31.4	Dubhe	193 42.5	N61 37.8									
	07	339 43.5	238 04.9 47.9	219 11.2 07.1	311 18.4 30.9	1 00.5 31.4	Elnath	278 04.0	N28 37.6									
	08	354 45.9	253 04.4 47.7	234 12.2 06.8	326 20.3 31.1	16 02.8 31.3	Eltanin	90 42.4	N51 28.9									
	09	9 48.4	268 04.0 . . 47.5	249 13.2 . . 06.5	341 22.3 . . 31.3	31 05.2 . . 31.3	Enif	33 40.2	N 9 58.7									
	10	24 50.8	283 03.5 47.3	264 14.1 06.2	356 24.2 31.5	46 07.5 31.2	Fomalhaut	15 16.2	S29 29.9									
	11	39 53.3	298 03.0 47.1	279 15.1 05.8	11 26.1 31.7	61 09.9 31.2												
	12	54 55.8	313 02.5 N25 46.9	294 16.1 N22 05.5	26 28.0 N10 31.9	76 12.2 S10 31.2	Gacrux	171 52.8	S57 14.8									
	13	69 58.2	328 02.1 46.7	309 17.0 05.2	41 29.9 32.1	91 14.6 31.1	Gienah	175 44.8	S17 40.4									
	14	85 00.7	343 01.6 46.5	324 18.0 04.9	56 31.9 32.3	106 16.9 31.1	Hadar	148 37.4	S60 29.2									
	15	100 03.2	358 01.1 . . 46.3	339 19.0 . . 04.6	71 33.8 . . 32.5	121 19.2 . . 31.1	Hamal	327 53.1	N23 34.2									
	16	115 05.6	13 00.7 46.1	354 20.0 04.3	86 35.7 32.7	136 21.6 31.0	Kaus Aust.	83 34.0	S34 22.4									
	17	130 08.1	28 00.2 45.9	9 20.9 04.0	101 37.6 32.9	151 23.9 31.0												
	18	145 10.6	42 59.7 N25 45.7	24 21.9 N22 03.7	116 39.5 N10 33.1	166 26.3 S10 30.9	Kochab	137 18.6	N74 03.6									
	19	160 13.0	57 59.2 45.5	39 22.9 03.4	131 41.5 33.3	181 28.6 30.9	Markab	13 31.4	N15 19.6									
	20	175 15.5	72 58.8 45.3	54 23.8 03.0	146 43.4 33.4	196 31.0 30.9	Menkar	314 07.9	N 4 10.8									
	21	190 17.9	87 58.3 . . 45.1	69 24.8 . . 02.7	161 45.3 . . 33.6	211 33.3 . . 30.8	Menkent	147 58.9	S36 29.2									
	22	205 20.4	102 57.8 44.9	84 25.8 02.4	176 47.2 33.8	226 35.6 30.8	Miaplacidus	221 38.7	S69 49.0									
	23	220 22.9	117 57.4 44.7	99 26.8 02.1	191 49.1 34.0	241 38.0 30.8												
THURSDAY	00	235 25.3	132 56.9 N25 44.5	114 27.7 N22 01.8	206 51.1 N10 34.2	256 40.3 S10 30.7	Mirfak	308 30.8	N49 56.5									
	01	250 27.8	147 56.5 44.3	129 28.7 01.5	221 53.0 34.4	271 42.7 30.7	Nunki	75 49.2	S26 16.0									
	02	265 30.3	162 56.0 44.0	144 29.7 01.2	236 54.9 34.6	286 45.0 30.6	Peacock	53 07.7	S56 39.4									
	03	280 32.7	177 55.5 . . 43.8	159 30.6 . . 00.9	251 56.8 . . 34.8	301 47.4 . . 30.6	Pollux	243 19.2	N27 58.3									
	04	295 35.2	192 55.1 43.6	174 31.6 00.5	266 58.8 35.0	316 49.7 30.6	Procyon	244 52.5	N 5 09.9									
	05	310 37.7	207 54.6 43.4	189 32.6 22 00.2	282 00.7 35.2	331 52.1 30.5												
	06	325 40.1	222 54.1 N25 43.2	204 33.6 N21 59.9	297 02.6 N10 35.4	346 54.4 S10 30.5	Rasalhague	95 59.5	N12 32.5									
	07	340 42.6	237 53.7 43.0	219 34.5 59.6	312 04.5 35.6	1 56.8 30.5	Regulus	207 35.9	N11 51.2									
	08	355 45.1	252 53.2 42.8	234 35.5 59.3	327 06.4 35.8	16 59.1 30.4	Rigel	281 05.5	S 8 10.6									
	09	10 47.5	267 52.8 . . 42.5	249 36.5 . . 59.0	342 08.4 . . 36.0	32 01.4 . . 30.4	Rigel Kent.	139 41.6	S60 56.0									
	10	25 50.0	282 52.3 42.3	264 37.4 58.6	357 10.3 36.2	47 03.8 30.3	Sabik	102 04.1	S15 45.3									
	11	40 52.4	297 51.9 42.1	279 38.4 58.3	12 12.2 36.4	62 06.1 30.3												
	12	55 54.9	312 51.4 N25 41.9	294 39.4 N21 58.0	27 14.1 N10 36.6	77 08.5 S10 30.3	Schedar	349 33.0	N56 39.6									
	13	70 57.4	327 50.9 41.6	309 40.4 57.7	42 16.0 36.8	92 10.8 30.2	Shaula	96 11.9	S37 07.2									
	14	85 59.8	342 50.5 41.4	324 41.3 57.4	57 18.0 37.0	107 13.2 30.2	Sirius	258 27.7	S16 45.0									
	15	101 02.3	357 50.0 . . 41.2	339 42.3 . . 57.1	72 19.9 . . 37.2	122 15.5 . . 30.2	Spica	158 23.5	S11 17.1									
	16	116 04.8	12 49.6 41.0	354 43.3 56.8	87 21.8 37.4	137 17.9 30.1	Suhail	222 47.4	S43 31.8									
	17	131 07.2	27 49.1 40.7	9 44.2 56.4	102 23.7 37.6	152 20.2 30.1												
	18	146 09.7	42 48.7 N25 40.5	24 45.2 N21 56.1	117 25.7 N10 37.8	167 22.6 S10 30.1	Vega	80 33.8	N38 48.1									
	19	161 12.2	57 48.2 40.3	39 46.2 55.8	132 27.6 38.0	182 24.9 30.0	Zuben'ubi	136 57.2	S16 08.4									
	20	176 14.6	72 47.8 40.0	54 47.2 55.5	147 29.5 38.2	197 27.3 30.0												
	21	191 17.1	87 47.3 . . 39.8	69 48.1 . . 55.2	162 31.4 . . 38.4	212 29.6 . . 29.9												
	22	206 19.6	102 46.9 39.6	84 49.1 54.8	177 33.3 38.6	227 32.0 29.9	Venus	258 42.0	h 15 08									
	23	221 22.0	117 46.4 39.3	99 50.1 54.5	192 35.3 38.8	242 34.3 29.9	Mars	23										

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise			
										Naut.	Civil		16	17	18	19
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>	HP	h m		h m	h m		h m	h m	h m	h m
TUESDAY	^{d h} 16 00	180 54.6 N18 59.4	224 04.2 12.9 N	1	39.0 16.2	58.4		N 72				02 41	02 05	01 16		
	01	195 54.6 19 00.0	238 36.1 12.9	1	55.2 16.1	58.4		N 70				02 44	02 17	01 43	00 37	
	02	210 54.6 00.6	253 08.0 12.9	2	11.3 16.2	58.4		68				01 37	02 47	02 27	02 03	
	03	225 54.5 01.2	267 39.9 13.0	2	27.5 16.1	58.4		66				02 15	02 49	02 35	02 20	
	04	240 54.5 01.7	282 11.9 12.9	2	43.6 16.1	58.4		64				00 55	02 42	02 42	02 33	
	05	255 54.5 02.3	296 43.8 12.9	2	59.7 16.0	58.4		62				01 44	03 02	02 52	02 45	
	06	270 54.5 N19 02.9	311 15.7 12.9 N	3	15.7 16.1	58.3		60				02 14	03 18	02 53	02 54	
	07	285 54.5 03.5	325 47.6 12.9	3	31.8 16.0	58.3		N 58				02 36	03 32	02 55	02 58	
	08	300 54.5 04.1	340 19.5 12.9	3	47.8 16.0	58.3		56				02 54	03 44	02 56	03 03	
	09	315 54.5 04.6	354 51.4 13.0	4	03.8 15.9	58.3		54				03 08	03 55	02 57	03 06	
	10	330 54.5 05.2	9 23.4 12.9	4	19.7 16.0	58.3		50				03 21	04 04	02 58	03 10	
	11	345 54.4 05.8	23 55.3 12.8	4	35.7 15.9	58.3		45				03 32	04 12	02 58	03 13	
	12	0 54.4 N19 06.4	38 27.1 12.9 N	4	51.6 15.8	58.2		N 40				04 13	04 43	03 02	03 26	
	13	15 54.4 06.9	52 59.0 12.9	5	07.4 15.9	58.2		35				04 27	04 55	03 03	03 31	
	14	30 54.4 07.5	67 30.9 12.9	5	23.3 15.8	58.2		30				04 39	05 06	03 04	03 35	
	15	45 54.4 08.1	82 02.8 12.8	5	39.1 15.7	58.2		20				05 00	05 23	03 07	03 43	
	16	60 54.4 08.7	96 34.6 12.9	5	54.8 15.8	58.2		N 10				05 16	05 39	03 08	03 50	
	17	75 54.4 09.2	111 06.5 12.8	6	10.6 15.7	58.2		0				05 31	05 53	03 10	03 57	
	18	90 54.3 N19 09.8	125 38.3 12.8 N	6	26.3 15.6	58.1		S 10				05 45	06 07	03 12	04 03	
	19	105 54.3 10.4	140 10.1 12.8	6	41.9 15.7	58.1		20				05 59	06 22	03 14	04 11	
	20	120 54.3 11.0	154 41.9 12.8	6	57.6 15.5	58.1		30				06 13	06 39	03 16	04 19	
	21	135 54.3 11.5	169 13.7 12.7	7	13.1 15.6	58.1		35				06 22	06 49	03 18	04 24	
	22	150 54.3 12.1	183 45.4 12.8	7	28.7 15.5	58.1		40				06 31	07 00	03 19	04 29	
	23	165 54.3 12.7	198 17.2 12.7	7	44.2 15.4	58.1		45				06 41	07 13	03 21	04 35	
WEDNESDAY	17 00	180 54.2 N19 13.2	212 48.9 12.7 N	7	59.6 15.4	58.0		S 50				06 53	07 29	03 23	04 43	
	01	195 54.2 13.8	227 20.6 12.6	8	15.0 15.3	58.0		52				06 17	06 59	03 24	04 47	
	02	210 54.2 14.4	241 52.2 12.7	8	30.3 15.3	58.0		54				06 21	07 05	03 25	04 51	
	03	225 54.2 15.0	256 23.9 12.6	8	45.6 15.3	58.0		56				06 25	07 11	03 26	04 55	
	04	240 54.2 15.5	270 55.5 12.6	9	00.9 15.2	58.0		58				06 30	07 19	03 28	05 00	
	05	255 54.2 16.1	285 27.1 12.6	9	16.1 15.1	57.9		S 60				06 34	07 27	03 29	05 05	
	06	270 54.1 N19 16.7	299 58.7 12.5 N	9	31.2 15.1	57.9				Twilight		Moonset				
	07	285 54.1 17.2	314 30.2 12.6	9	46.3 15.1	57.9		Lat.	Sunset			16	17	18	19	
	08	300 54.1 17.8	329 01.8 12.4	10	01.4 14.9	57.9				Civil	Naut.					
	09	315 54.1 18.4	343 33.2 12.5	10	16.3 15.0	57.9						h m	h m	h m	h m	
	10	330 54.1 18.9	358 04.7 12.4	10	31.3 14.8	57.8		N 72				16 51	19 20			
	11	345 54.0 19.5	12 36.1 12.4	10	46.1 14.8	57.8		N 70				16 42	18 56	21 44		
	12	0 54.0 N19 20.0	27 07.5 12.4 N11	00.9 14.8	57.8			68				22 21	16 34	18 37	20 56	
	13	15 54.0 20.6	41 38.9 12.3	11	15.7 14.6	57.8		66				21 41	16 28	18 22	20 25	
	14	30 54.0 21.2	56 10.2 12.3	11	30.3 14.6	57.8		64				21 41	16 23	18 10	20 03	
	15	45 54.0 21.7	70 41.5 12.3	11	44.9 14.6	57.8		62				23 07	16 19	18 00	19 45	
	16	60 53.9 22.3	85 12.8 12.2	11	59.5 14.5	57.7		60				20 53	16 19	18 00	19 45	
	17	75 53.9 22.9	99 44.0 12.2	12	14.0 14.4	57.7		60				20 36	16 15	17 51	19 30	
	18	90 53.9 N19 23.4	114 15.2 12.1 N12	28.4 14.3	57.7			N 58				20 22	21 19	23 11	16 11	
	19	105 53.9 24.0	128 46.3 12.1	12	42.7 14.3	57.7		56				20 10	21 01	22 23	16 09	
	20	120 53.9 24.5	143 17.4 12.1	12	57.0 14.2	57.6		54				20 19	20 46	21 54	16 06	
	21	135 53.8 25.1	157 48.5 12.0	13	11.2 14.1	57.6		52				19 50	20 33	21 33	16 03	
	22	150 53.8 25.7	172 19.5 12.0	13	25.3 14.0	57.6		50				19 42	20 22	21 15	16 01	
	23	165 53.8 26.2	186 50.5 12.0	13	39.3 14.0	57.6		45				19 24	19 59	20 43	15 57	
THURSDAY	18 00	180 53.8 N19 26.8	201 21.5 11.9 N13	53.3 13.9	57.6			N 40				19 10	19 41	20 19	15 53	
	01	195 53.8 27.3	215 52.4 11.9	14	07.2 13.8	57.5		35				18 58	19 26	20 01	15 49	
	02	210 53.7 27.9	230 23.3 11.8	14	21.0 13.8	57.5		30				18 48	19 14	19 45	15 46	
	03	225 53.7 28.4	244 54.1 11.8	14	34.8 13.6	57.5		20				18 30	18 53	19 21	15 41	
	04	240 53.7 29.0	259 24.9 11.7	14	48.4 13.6	57.5		N 10				18 14	18 37	19 03	15 37	
	05	255 53.7 29.5	273 55.6 11.7	15	02.0 13.5	57.5		0				18 00	18 22	18 47	15 32	
	06	270 53.6 N19 30.1	288 26.3 11.6 N15	15.5 13.4	57.4			S 10				17 46	18 08	18 34	15 28	
	07	285 53.6 30.6	302 56.9 11.6	15	28.9 13.3	57.4		20				17 31	17 54	18 21	15 24	
	08	300 53.6 31.2	317 27.5 11.6	15	42.2 13.2	57.4		30				17 14	17 39	18 08	15 18	
	09	315 53.6 31.8	331 58.1 11.5	15	55.4 13.2	57.4		35				17 04	17 31	18 02	15 16	
	10	330 53.5 32.3	346 28.6 11.4	16	08.6 13.1	57.4		40				16 53	17 22	17 55	15 12	
	11	345 53.5 32.9	0 59.0 11.4	16	21.7 12.9	57.3		45				16 39	17 11	17 47	15 08	
	12	0 53.5 N19 33.4	15 29.4 11.4 N16	34.6 12.9	57.3			S 50				16 23	16 59	17 39	15 04	
	13	15 53.5 34.0	29 59.8 11.3	16	47.5 12.8	57.3		52				16 16	16 54	17 35	15 02	
	14	30 53.4 34.5	44 30.1 11.3	17	00.3 12.7	57.3		54				16 07	16 48	17 31	15 00	
	15	45 53.4 35.0	59 00.4 11.2	17	13.0 12.6	57.2		56				15 58	16 41	17 27	14 57	
	16	60 53.4 35.6	73 30.6 11.1	17	25.6 12.5	57.2		58				15 47	16 34	17 23	14 54	
	17	75 53.4 36.1	88 00.7 11.1	17	38.1 12.4	57.2		S 60				15 35	16 25	17 18	14 51	
	18	90 53.3 N19 36.7	102 30.8 11.1 N17	50.5 12.3	57.2					SUN		MOON				
	19	105 53.3 37.2	117 00.9 11.0													
	20	120 53.0														

UT	ARIES		VENUS -4.3		MARS +1.5		JUPITER -2.1		SATURN +0.8		STARS		
d h	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
1900	236 24.5	132 46.0	N25 39.1	114 51.0	N21 54.2	207 37.2	N10 39.0	257 36.7	S10 29.8	Acamar	315 13.2	S40 12.7	
01	251 26.9	147 45.5	38.9	129 52.0	53.9	222 39.1	39.1	272 39.0	29.8	Achernar	335 21.7	S57 07.0	
02	266 29.4	162 45.1	38.6	144 53.0	53.6	237 41.0	39.3	287 41.4	29.8	Acruz	173 01.2	S63 13.9	
03	281 31.9	177 44.6	38.4	159 54.0	53.3	252 43.0	39.5	302 43.7	29.7	Adhara	255 07.2	S29 00.4	
04	296 34.3	192 44.2	38.1	174 54.9	52.9	267 44.9	39.7	317 46.1	29.7	Aldebaran	290 41.6	N16 33.3	
05	311 36.8	207 43.8	37.9	189 55.9	52.6	282 46.8	39.9	332 48.4	29.7				
06	326 39.3	222 43.3	N25 37.7	204 56.9	N21 52.3	297 48.7	N10 40.1	347 50.8	S10 29.6	Alioth	166 13.8	N55 50.2	
07	341 41.7	237 42.9	37.4	219 57.8	52.0	312 50.7	40.3	2 53.1	29.6	Alkaid	152 52.7	N49 11.9	
08	356 44.2	252 42.4	37.2	234 58.8	51.7	327 52.6	40.5	17 55.5	29.5	Alnair	27 34.7	S46 50.1	
09	11 46.7	267 42.0	36.9	249 59.8	51.3	342 54.5	40.7	32 57.8	29.5	Alnilam	275 39.4	S 1 11.1	
10	26 49.1	282 41.5	36.7	265 00.8	51.0	357 56.4	40.9	48 00.2	29.5	Alphard	217 49.2	S 8 45.7	
11	41 51.6	297 41.1	36.4	280 01.7	50.7	12 58.3	41.1	63 02.5	29.4				
12	56 54.1	312 40.7	N25 36.2	295 02.7	N21 50.4	28 00.3	N10 41.3	78 04.9	S10 29.4	Alphecca	126 04.5	N26 38.1	
13	71 56.5	327 40.2	35.9	310 03.7	50.0	43 02.2	41.5	93 07.2	29.4	Alpheratz	357 36.4	N29 12.9	
14	86 59.0	342 39.8	35.7	325 04.6	49.7	58 04.1	41.7	108 09.6	29.3	Altair	62 01.1	N 8 55.6	
15	102 01.4	357 39.4	35.4	340 05.6	49.4	73 06.0	41.9	123 11.9	29.3	Ankaa	353 08.8	S42 10.7	
16	117 03.9	12 38.9	35.2	355 06.6	49.1	88 08.0	42.1	138 14.3	29.3	Antares	112 17.2	S26 29.0	
17	132 06.4	27 38.5	34.9	10 07.6	48.8	103 09.9	42.3	153 16.6	29.2				
18	147 08.8	42 38.1	N25 34.7	25 08.5	N21 48.4	118 11.8	N10 42.5	168 19.0	S10 29.2	Arcturus	145 48.9	N19 03.7	
19	162 11.3	57 37.6	34.4	40 09.5	48.1	133 13.7	42.7	183 21.3	29.2	Atria	107 12.1	S69 04.1	
20	177 13.8	72 37.2	34.2	55 10.5	47.8	148 15.7	42.9	198 23.7	29.1	Avior	234 15.6	S59 35.3	
21	192 16.2	87 36.8	33.9	70 11.4	47.5	163 17.6	43.1	213 26.0	29.1	Bellatrix	278 24.7	N 6 22.2	
22	207 18.7	102 36.3	33.7	85 12.4	47.1	178 19.5	43.2	228 28.4	29.1	Betelgeuse	270 53.9	N 7 24.6	
23	222 21.2	117 35.9	33.4	100 13.4	46.8	193 21.4	43.4	243 30.7	29.0				
2000	237 23.6	132 35.5	N25 33.1	115 14.4	N21 46.5	208 23.3	N10 43.6	258 33.1	S10 29.0	Canopus	263 53.5	S52 42.6	
01	252 26.1	147 35.0	32.9	130 15.3	46.2	223 25.3	43.8	273 35.4	29.0	Capella	280 24.4	N46 01.3	
02	267 28.5	162 34.6	32.6	145 16.3	45.8	238 27.2	44.0	288 37.8	28.9	Deneb	49 26.6	N45 21.5	
03	282 31.0	177 34.2	32.3	160 17.3	45.5	253 29.1	44.2	303 40.1	28.9	Denebola	182 26.2	N14 26.6	
04	297 33.5	192 33.8	32.1	175 18.2	45.2	268 31.0	44.4	318 42.5	28.9	Diphda	348 48.9	S17 51.6	
05	312 35.9	207 33.3	31.8	190 19.2	44.9	283 33.0	44.6	333 44.8	28.8				
06	327 38.4	222 32.9	N25 31.6	205 20.2	N21 44.5	298 34.9	N10 44.8	348 47.2	S10 28.8	Dubhe	193 42.5	N61 37.8	
07	342 40.9	237 32.5	31.3	220 21.2	44.2	313 36.8	45.0	3 49.5	28.7	Elnath	278 04.0	N28 37.6	
08	357 43.3	252 32.1	31.0	235 22.1	43.9	328 38.7	45.2	18 51.9	28.7	Eltanin	90 42.4	N51 28.9	
09	12 45.8	267 31.6	30.7	250 23.1	43.6	343 40.7	45.4	33 54.2	28.7	Enif	33 40.1	N 9 58.1	
10	27 48.3	282 31.2	30.5	265 24.1	43.2	358 42.6	45.6	48 56.6	28.6	Fomalhaut	15 16.1	S29 29.9	
11	42 50.7	297 30.8	30.2	280 25.0	42.9	13 44.5	45.8	63 58.9	28.6				
12	57 53.2	312 30.4	N25 29.9	295 26.0	N21 42.6	28 46.4	N10 46.0	79 01.3	S10 28.6	Gacrux	171 52.8	S57 14.8	
13	72 55.7	327 29.9	29.7	310 27.0	42.3	43 48.4	46.2	94 03.7	28.5	Gienah	175 44.8	S17 40.4	
14	87 58.1	342 29.5	29.4	325 28.0	41.9	58 50.3	46.4	109 06.0	28.5	Hadar	148 37.4	S60 29.3	
15	103 00.6	357 29.1	29.1	340 28.9	41.6	73 52.2	46.6	124 08.4	28.5	Hamal	327 53.1	N23 34.2	
16	118 03.0	12 28.7	28.8	355 29.9	41.3	88 54.1	46.7	139 10.7	28.4	Kaus Aust.	83 34.0	S34 22.4	
17	133 05.5	27 28.3	28.6	10 30.9	40.9	103 56.1	46.9	154 13.1	28.4				
18	148 08.0	42 27.9	N25 28.3	25 31.8	N21 40.6	118 58.0	N10 47.1	169 15.4	S10 28.4	Kochab	137 18.6	N74 03.6	
19	163 10.4	57 27.4	28.0	40 32.8	40.3	133 59.9	47.3	184 17.8	28.3	Markab	13 31.9	N15 19.6	
20	178 12.9	72 27.0	27.7	55 33.8	40.0	149 01.8	47.5	199 20.1	28.3	Menkar	314 07.1	N 4 10.8	
21	193 15.4	87 26.6	27.4	70 34.8	39.6	164 03.8	47.7	214 22.5	28.3	Menkent	147 58.9	S36 29.2	
22	208 17.8	102 26.2	27.1	85 35.7	39.3	179 05.7	47.9	229 24.8	28.2	Miaplacidus	221 38.8	S69 49.0	
23	223 20.3	117 25.8	26.9	100 36.7	39.0	194 07.6	48.1	244 27.2	28.2				
2100	238 22.8	132 25.4	N25 26.6	115 37.7	N21 38.6	209 09.5	N10 48.3	259 29.6	S10 28.2	Mirfak	308 30.7	N49 56.1	
01	253 25.2	147 25.0	26.3	130 38.6	38.3	224 11.5	48.5	274 31.9	28.1	Nunki	75 49.2	S26 16.0	
02	268 27.7	162 24.6	26.0	145 39.6	38.0	239 13.4	48.7	289 34.3	28.1	Peacock	53 07.7	S56 39.4	
03	283 30.2	177 24.1	25.7	160 40.6	37.7	254 15.3	48.9	304 36.6	28.1	Pollux	243 19.2	N27 58.3	
04	298 32.6	192 23.7	25.4	175 41.6	37.3	269 17.2	49.1	319 39.0	28.0	Procyon	244 52.5	N 5 09.9	
05	313 35.1	207 23.3	25.1	190 42.5	37.0	284 19.2	49.3	334 41.3	28.0				
06	328 37.5	222 22.9	N25 24.8	205 43.5	N21 36.7	299 21.1	N10 49.5	349 43.7	S10 28.0	Rasalhague	95 59.5	N12 32.5	
07	343 40.0	237 22.5	24.6	220 44.5	36.3	314 23.0	49.6	4 46.1	27.9	Regulus	207 35.9	N11 51.2	
08	358 42.5	252 22.1	24.3	235 45.4	36.0	329 25.0	49.8	19 48.4	27.9	Rigel	281 05.5	S 8 10.6	
09	13 44.9	267 21.7	24.0	250 46.4	35.7	344 26.9	50.0	34 50.8	27.9	Rigel Kent.	139 41.6	S60 56.0	
10	28 47.4	282 21.3	23.7	265 47.4	35.3	359 28.8	50.2	49 53.1	27.8	Sabik	102 04.0	S15 45.3	
11	43 49.9	297 20.9	23.4	280 48.4	35.0	14 30.7	50.4	64 55.5	27.8				
12	58 52.3	312 20.5	N25 23.1	295 49.3	N21 34.7	29 32.7	N10 50.6	79 57.8	S10 27.8	Schedar	349 33.0	N56 39.6	
13	73 54.8	327 20.1	22.8	310 50.3	34.3	44 34.6	50.8	95 00.2	27.7	Shaula	96 11.9	S37 07.2	
14	88 57.3	342 19.7	22.5	325 51.3	34.0	59 36.5	51.0	110 02.6	27.7	Sirius	258 27.7	S16 45.0	
15	103 59.7	357 19.3	22.2	340 52.2	33.7	74 38.4	51.2	125 04.9	27.7	Spica	158 23.5	S11 17.1	
16	119 02.2	12 18.9	21.9	355 53.2	33.3	89 40.4	51.4	140 07.3	27.7	Suhail	222 47.4	S43 31.8	
17	134 04.7	27 18.5	21.6	10 54.2	33.0	104 42.3	51.6	155 09.6	27.6				
18	149 07.1	42 18.1	N25 21.3	25 55.2	N21 32.7	119 44.2	N10 51.8	170 12.0	S10 27.6	Vega	80 33.8	N38 48.1	
19	164 09.6	57 17.7	21.0	40 56.1	32.3	134 46.1	52.0	185 14.3	27.6	Zuben'ubi	136 57.2	S16 08.4	
20	179 12.0	72 17.3	20.7	55 57.1	32.0	149 48.1	52.2	200 16.7	27.5				
21	194 14.5	87 16.9	20.4	70 58.1	31.7	164 50.0	52.3	215 19.1	27.5				
22	209 17.0	102 16.5	20.1	85 59.1	31.3	179 51.9	52.5	230 21.4	27.5				
23	224 19.4	117 16.1	19.8	101 00.0	31.0	194 53.9	52.7	245 23.8	27.4				
											SHA	Mer.Pass.	
											h m	h m	
Mer.Pass. 8 09.1											Venus	255 11.8 15 10	
											Mars	237 50.7 16 18	
											Jupiter	330 59.7 10 05	
											Saturn	21 09.4 6 45	

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise						
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	19	20	21	22		
										h						m	h
F R I D A Y	1900	180 53.2	N19 40.0	189 30.4	10.8	N19 02.8	11.7	57.0	N 72								
	01	195 53.1	40.5	204 00.2	10.7	19 14.5	11.5	57.0	N 70				00 37				
	02	210 53.1	41.0	218 29.9	10.6	19 26.0	11.5	57.0	68	////	////	01 18	01 27				
	03	225 53.1	41.6	232 59.5	10.6	19 37.5	11.4	57.0	66	////	////	02 03	01 58	01 14			
	04	240 53.0	42.1	247 29.1	10.6	19 48.9	11.2	56.9	64	////	00 19	02 32	02 22	02 06			
	05	255 53.0	42.7	261 58.7	10.5	20 00.1	11.2	56.9	62	////	01 30	02 54	02 41	02 38	02 36	02 40	02 40
	06	270 53.0	N19 43.2	276 28.2	10.4	N20 11.3	11.0	56.9	60	////	02 04	03 12	02 57	03 02	03 14	03 41	03 41
	07	285 53.0	43.7	290 57.6	10.4	20 22.3	11.0	56.9	N 58	00 17	02 28	03 26	03 10	03 21	03 41	04 15	04 15
	08	300 52.9	44.3	305 27.0	10.3	20 33.3	10.8	56.9	56	01 22	02 47	03 39	03 22	03 38	04 02	04 44	04 44
	09	315 52.9	44.8	319 56.3	10.3	20 44.1	10.7	56.8	54	01 53	03 03	03 50	03 32	03 51	04 20	05 00	05 00
	10	330 52.9	45.3	334 25.6	10.3	20 54.8	10.5	56.8	52	02 15	03 16	03 59	03 41	04 03	04 35	05 15	05 15
	11	345 52.8	45.9	348 54.9	10.1	21 05.3	10.5	56.8	50	02 33	03 28	04 08	03 49	04 14	04 48	05 32	05 32
	12	0 52.8	N19 46.4	3 24.0	10.2	N21 15.8	10.3	56.8	45	03 07	03 51	04 26	04 06	04 37	05 14	06 01	06 01
	13	15 52.8	47.0	17 53.2	10.0	21 26.1	10.3	56.7	N 40	03 31	04 10	04 41	04 21	04 55	05 36	06 24	06 24
	14	30 52.7	47.5	32 22.2	10.1	21 36.4	10.1	56.7	35	03 50	04 25	04 53	04 33	05 10	05 54	06 43	06 43
	15	45 52.7	48.0	46 51.3	10.0	21 46.5	10.0	56.7	30	04 06	04 38	05 04	04 44	05 24	06 09	06 59	06 59
	16	60 52.7	48.6	61 20.3	9.9	21 56.5	9.8	56.7	20	04 30	04 59	05 22	05 02	05 47	06 35	07 27	07 27
	17	75 52.6	49.1	75 49.2	9.9	22 06.3	9.8	56.6	N 10	04 49	05 16	05 38	05 18	06 07	06 58	07 51	07 51
	18	90 52.6	N19 49.6	90 18.1	9.8	N22 16.1	9.6	56.6	0	05 05	05 31	05 53	05 34	06 25	07 19	08 13	08 13
	19	105 52.6	50.2	104 46.9	9.8	22 25.7	9.5	56.6	S 10	05 20	05 45	06 08	05 49	06 44	07 40	08 35	08 35
	20	120 52.5	50.7	119 15.7	9.7	22 35.2	9.3	56.6	20	05 33	06 00	06 23	06 06	07 04	08 03	08 59	08 59
	21	135 52.5	51.2	133 44.4	9.7	22 44.5	9.3	56.6	30	05 46	06 15	06 41	06 25	07 28	08 29	09 27	09 27
	22	150 52.5	51.7	148 13.1	9.6	22 53.8	9.1	56.5	35	05 53	06 24	06 51	06 36	07 42	08 45	09 43	09 43
23	165 52.4	52.3	162 41.7	9.6	23 02.9	9.0	56.5	40	06 00	06 33	07 03	06 49	07 58	09 03	10 02	10 02	
24								45	06 08	06 44	07 16	07 04	08 17	09 26	10 26	10 26	
S A T U R D A Y	2000	180 52.4	N19 52.8	177 10.3	9.5	N23 11.9	8.8	56.5	S 50	06 17	06 57	07 33	07 23	08 42	09 54	10 56	10 56
	01	195 52.4	53.3	191 38.8	9.5	23 20.7	8.8	56.5	52	06 21	07 02	07 41	07 32	08 53	10 08	11 10	11 10
	02	210 52.3	53.9	206 07.3	9.5	23 29.8	8.6	56.4	54	06 25	07 09	07 50	07 43	09 07	10 24	11 28	11 28
	03	225 52.3	54.4	220 35.8	9.4	23 38.1	8.4	56.4	56	06 29	07 16	07 59	07 54	09 22	10 43	11 48	11 48
	04	240 52.3	54.9	235 04.2	9.3	23 46.5	8.4	56.4	58	06 34	07 24	08 10	08 07	09 41	11 07	12 14	12 14
	05	255 52.2	55.4	249 32.5	9.4	23 54.9	8.2	56.4	S 60	06 39	07 32	08 23	08 23	10 04	11 38	12 51	12 51
	06	270 52.2	N19 56.0	264 00.9	9.2	N24 03.1	8.0	56.3									
	07	285 52.2	56.5	278 29.1	9.3	24 11.1	8.0	56.3	Lat.	Sunset	Twilight		Moonset				
	08	300 52.1	57.0	292 57.4	9.2	24 19.1	7.8	56.3			Civil	Naut.	19	20	21	22	
	09	315 52.1	57.5	307 25.6	9.1	24 26.9	7.6	56.3									
	10	330 52.1	58.1	321 53.7	9.1	24 34.5	7.5	56.2									
	11	345 52.0	58.6	336 21.8	9.1	24 42.0	7.4	56.2	N 72								
	12	0 52.0	N19 59.1	350 49.9	9.0	N24 49.4	7.3	56.2	N 70								
	13	15 51.9	19 59.6	5 17.9	9.0	24 56.7	7.1	56.2	68	22 41	////	////					
	14	30 51.9	20 00.1	19 45.9	9.0	25 03.8	7.0	56.2	66	21 53	////	////	22 56				
	15	45 51.9	00.7	34 13.9	8.9	25 10.8	6.8	56.1	64	21 23	////	////	22 05				
	16	60 51.8	01.2	48 41.8	8.9	25 17.6	6.7	56.1	62	21 01	22 27	////	21 34	23 26	25 15	01 15	01 15
	17	75 51.8	01.7	63 09.7	8.8	25 24.3	6.6	56.1	60	20 43	21 52	////	21 10	22 49	24 14	00 14	00 14
	18	90 51.8	N20 02.2	77 37.5	8.9	N25 30.9	6.4	56.1	N 58	20 28	21 27	////	20 52	22 22	23 40	24 36	24 36
	19	105 51.7	02.7	92 05.4	8.8	25 37.3	6.2	56.0	56	20 15	21 08	22 35	20 36	22 01	23 15	24 11	24 11
	20	120 51.7	03.3	106 33.2	8.7	25 43.5	6.2	56.0	54	20 04	20 52	22 03	20 23	21 44	22 55	23 51	23 51
	21	135 51.6	03.8	121 00.9	8.8	25 49.7	5.9	56.0	52	19 55	20 38	21 40	20 11	21 29	22 39	23 34	23 34
	22	150 51.6	04.3	135 28.7	8.7	25 55.6	5.9	56.0	50	19 46	20 26	21 21	20 01	21 17	22 24	23 20	23 20
23	165 51.6	04.8	149 56.4	8.6	26 01.5	5.7	55.9	45	19 28	20 03	20 47	19 39	20 50	21 55	22 50	22 50	
S U N D A Y	2100	180 51.5	N20 05.3	164 24.0	8.7	N26 07.2	5.5	55.9	N 40	19 13	19 44	20 23	19 22	20 30	21 32	22 22	22 22
	01	195 51.5	05.8	178 51.7	8.6	26 12.7	5.4	55.9	35	19 00	19 29	20 03	19 08	20 13	21 14	22 08	22 08
	02	210 51.4	06.3	193 19.3	8.6	26 18.1	5.3	55.9	30	18 49	19 16	19 48	18 55	19 58	20 57	21 52	21 52
	03	225 51.4	06.9	207 46.9	8.6	26 23.4	5.1	55.8	20	18 31	18 55	19 23	18 34	19 33	20 30	21 24	21 24
	04	240 51.4	07.4	222 14.5	8.6	26 28.5	5.0	55.8	N 10	18 15	18 37	19 04	18 15	19 11	20 07	21 01	21 01
	05	255 51.3	07.9	236 42.1	8.5	26 33.5	4.8	55.8	0	18 00	18 22	18 48	17 58	18 51	19 45	20 39	20 39
	06	270 51.3	N20 08.4	251 09.6	8.5	N26 38.3	4.7	55.8	S 10	17 45	18 08	18 33	17 41	18 31	19 23	20 16	20 16
	07	285 51.2	08.9	265 37.1	8.6	26 43.0	4.5	55.8	20	17 30	17 53	18 20	17 23	18 09	18 59	19 52	19 52
	08	300 51.2	09.4	280 04.7	8.4	26 47.5	4.4	55.7	30	17 12	17 38	18 07	17 02	17 44	18 32	19 25	19 25
	09	315 51.2	09.9	294 32.1	8.5	26 51.9	4.3	55.7	35	17 02	17 29	18 00	16 50	17 30	18 16	19 08	19 08
	10	330 51.1	10.4	308 59.6	8.5	26 56.2	4.0	55.7	40	16 50	17 20	17 53	16 36	17 13	17 57	18 49	18 49
	11	345 51.1	10.9	323 27.1	8.4	27 00.2	4.0	55.7	45	16 36	17 09	17 45	16 19	16 53	17 35	18 26	18 26
	12	0 51.0	N20 11.4	337 54.5	8.5	N27 04.2	3.8	55.6	S 50	16 20	16 56	17 36	15 59	16 28	17 06	17 56	17 56
	13	15 51.0	11.9	352 22.0	8.4	27 08.0	3.6	55.6	52	16 12	16 50	17 32	15 49	16 16	16 52	17 41	17 41
	14	30 50.9	12.5	6 49.4	8.4	27 11.6	3.5	55.6	54	16 03	16 44	17 28	15 39	16 02	16 36	17 24	17 24
	15	45 50.9	13.0	21 16.8	8.5	27 15.1	3.4	55.6	56	15 53	16 37	17 23	15 26	15 46	16 16	17 03	17 03
	16	60 50.9	13.5	35 44.3	8.4	27 18.5	3.2	55.6	58	15 42	16 29	17 18	15 12	15 27	15 52	16 37	16 37
	17	75 50.8	14.0	50 11.7	8.4	27 21.7	3.0	55.5	S 60	15 29	16 20	17 13	14 56	15 03	15 21	16 01	16 01
	18	90 50.8	N20 14.5	64 39.1	8.4	N27 24.7	2.9	55.5									
	19	105 50.7	15.0	79 06.5	8.4	27 27.6	2.8	55.5									
	20	120 50.7	15.5	93 33.9	8.4	27 30.4	2.6	55.5	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
	21	135 50.6	16.0	108 01.3	8.4	27 33.0	2.4	55.4		00h	12h	Pass.	Upper	Lower			
	22	150 50.6	16.5	122 28.7	8.5	27 35.4	2.3	55.4	d	m s	m s	h m	h m	h m	d	%	
23	165 50.5	17.0	136 56.2	8.4	N27 37.7	2.2	55.4	19	03 33	03 31							

UT	ARIES			VENUS −4.3			MARS +1.5			JUPITER −2.1			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
MONDAY	239 21.9	132 15.7	N25 19.4	116 01.0	N21 30.7	209 55.8	N10 52.9	260 26.1	S10 27.4	Acamar	315 13.2	S40 12.7						
	01 254 24.4	147 15.3	19.1	131 02.0	30.3	224 57.7	53.1	275 28.5	27.4	Achernar	335 21.7	S57 07.0						
	02 269 26.8	162 15.0	18.8	146 02.9	30.0	239 59.6	53.3	290 30.9	27.3	Acrux	173 01.2	S63 13.9						
	03 284 29.3	177 14.6	18.5	161 03.9	29.7	255 01.6	53.5	305 33.2	27.3	Adhara	255 07.2	S29 00.3						
	04 299 31.8	192 14.2	18.2	176 04.9	29.3	270 03.5	53.7	320 35.6	27.3	Aldebaran	290 41.5	N16 33.3						
	05 314 34.2	207 13.8	17.9	191 05.9	29.0	285 05.4	53.9	335 37.9	27.2									
	06 329 36.7	222 13.4	N25 17.6	206 06.8	N21 28.6	300 07.3	N10 54.1	350 40.3	S10 27.2	Alioth	166 13.8	N55 50.2						
	07 344 39.2	237 13.0	17.3	221 07.8	28.3	315 09.3	54.3	5 42.7	27.2	Alkaid	152 52.7	N49 11.9						
	08 359 41.6	252 12.6	16.9	236 08.8	28.0	330 11.2	54.5	20 45.0	27.1	Alnair	27 34.6	S46 50.7						
	09 14 44.1	267 12.2	16.6	251 09.7	27.6	345 13.1	54.7	35 47.4	27.1	Alnilam	275 39.4	S 1 11.3						
	10 29 46.5	282 11.9	16.3	266 10.7	27.3	0 15.1	54.8	50 49.7	27.1	Alphard	217 49.2	S 8 45.6						
	11 44 49.0	297 11.5	16.0	281 11.7	27.0	15 17.0	55.0	65 52.1	27.1									
	12 59 51.5	312 11.1	N25 15.7	296 12.7	N21 26.6	30 18.9	N10 55.2	80 54.5	S10 27.0	Alphecca	126 04.5	N26 38.1						
	13 74 53.9	327 10.7	15.3	311 13.6	26.3	45 20.8	55.4	95 56.8	27.0	Alpheratz	357 36.4	N29 12.9						
	14 89 56.4	342 10.3	15.0	326 14.6	25.9	60 22.8	55.6	110 59.2	27.0	Altair	62 01.1	N 8 55.7						
	15 104 58.9	357 10.0	14.7	341 15.6	25.6	75 24.7	55.8	126 01.5	26.9	Ankaa	353 08.7	S42 10.7						
	16 120 01.3	12 09.6	14.4	356 16.5	25.3	90 26.6	56.0	141 03.9	26.9	Antares	112 17.2	S26 29.0						
	17 135 03.8	27 09.2	14.0	11 17.5	24.9	105 28.6	56.2	156 06.3	26.9									
	18 150 06.3	42 08.8	N25 13.7	26 18.5	N21 24.6	120 30.5	N10 56.4	171 08.6	S10 26.8	Arcturus	145 48.9	N19 03.7						
	19 165 08.7	57 08.4	13.4	41 19.5	24.3	135 32.4	56.6	186 11.0	26.8	Atria	107 12.1	S69 04.1						
	20 180 11.2	72 08.1	13.1	56 20.4	23.9	150 34.3	56.8	201 13.4	26.8	Avior	234 15.6	S59 35.3						
	21 195 13.6	87 07.7	12.7	71 21.4	23.6	165 36.3	57.0	216 15.7	26.7	Bellatrix	278 24.7	N 6 22.2						
	22 210 16.1	102 07.3	12.4	86 22.4	23.2	180 38.2	57.1	231 18.1	26.7	Betelgeuse	270 53.9	N 7 24.6						
	23 225 18.6	117 06.9	12.1	101 23.3	22.9	195 40.1	57.3	246 20.4	26.7									
	TUESDAY	240 21.0	132 06.6	N25 11.7	116 24.3	N21 22.6	210 42.1	N10 57.5	261 22.8	S10 26.7	Canopus	263 53.5	S52 42.6					
01 255 23.5		147 06.2	11.4	131 25.3	22.2	225 44.0	57.7	276 25.2	26.6	Capella	280 24.4	N46 01.3						
02 270 26.0		162 05.8	11.1	146 26.3	21.9	240 45.9	57.9	291 27.5	26.6	Deneb	49 26.5	N45 21.5						
03 285 28.4		177 05.5	10.7	161 27.2	21.5	255 47.8	58.1	306 29.9	26.6	Denebola	182 26.2	N14 26.6						
04 300 30.9		192 05.1	10.4	176 28.2	21.2	270 49.8	58.3	321 32.3	26.5	Diphda	348 48.9	S17 51.5						
05 315 33.4		207 04.7	10.1	191 29.2	20.8	285 51.7	58.5	336 34.6	26.5									
06 330 35.8		222 04.4	N25 09.7	206 30.2	N21 20.5	300 53.6	N10 58.7	351 37.0	S10 26.5	Dubhe	193 42.5	N61 37.8						
07 345 38.3		237 04.0	09.4	221 31.1	20.2	315 55.6	58.9	6 39.3	26.4	El Nath	278 04.0	N28 37.6						
08 0 40.8		252 03.6	09.0	236 32.1	19.8	330 57.5	59.1	21 41.7	26.4	Eltanin	90 42.3	N51 28.9						
09 15 43.2		267 03.3	08.7	251 33.1	19.5	345 59.4	59.2	36 44.1	26.4	Enif	33 40.1	N 9 58.8						
10 30 45.7		282 02.9	08.4	266 34.0	19.1	1 01.3	59.4	51 46.4	26.4	Fomalhaut	15 16.1	S29 29.9						
11 45 48.1		297 02.5	08.0	281 35.0	18.8	16 03.3	59.6	66 48.8	26.3									
12 60 50.6		312 02.2	N25 07.7	296 36.0	N21 18.5	31 05.2	N10 59.8	81 51.2	S10 26.3	Gacrux	171 52.8	S57 14.8						
13 75 53.1		327 01.8	07.3	311 37.0	18.1	46 07.1	11 00.0	96 53.5	26.3	Gienah	175 44.8	S17 40.4						
14 90 55.5		342 01.5	07.0	326 37.9	17.8	61 09.1	00.2	111 55.9	26.2	Hadar	148 37.4	S60 29.3						
15 105 58.0		357 01.1	06.6	341 38.9	17.4	76 11.0	00.4	126 58.3	26.2	Hamal	327 53.1	N23 34.2						
16 121 00.5		12 00.7	06.3	356 39.9	17.1	91 12.9	00.6	142 00.6	26.2	Kaus Aust.	83 34.0	S34 22.4						
17 136 02.9		27 00.4	05.9	11 40.8	16.7	106 14.9	00.8	157 03.0	26.1									
18 151 05.4		42 00.0	N25 05.6	26 41.8	N21 16.4	121 16.8	N11 01.0	172 05.4	S10 26.1	Kochab	137 18.6	N74 03.7						
19 166 07.9		56 59.7	05.2	41 42.8	16.0	136 18.7	01.1	187 07.7	26.1	Markab	13 31.3	N15 19.7						
20 181 10.3		71 59.3	04.9	56 43.8	15.7	151 20.6	01.3	202 10.1	26.1	Menkar	314 07.9	N 4 10.8						
21 196 12.8		86 59.0	04.5	71 44.7	15.4	166 22.6	01.5	217 12.5	26.0	Menkent	147 58.9	S36 29.2						
22 211 15.3		101 58.6	04.2	86 45.7	15.0	181 24.5	01.7	232 14.8	26.0	Miaplacidus	221 38.8	S69 49.0						
23 226 17.7		116 58.2	03.8	101 46.7	14.7	196 26.4	01.9	247 17.2	26.0									
WEDNESDAY		241 20.2	131 57.9	N25 03.5	116 47.6	N21 14.3	211 28.4	N11 02.1	262 19.6	S10 25.9	Mirfak	308 30.7	N49 56.5					
	01 256 22.6	146 57.5	03.1	131 48.6	14.0	226 30.3	02.3	277 21.9	25.9	Nunki	75 49.2	S26 16.0						
	02 271 25.1	161 57.2	02.8	146 49.6	13.6	241 32.2	02.5	292 24.3	25.9	Peacock	53 07.6	S56 39.4						
	03 286 27.6	176 56.8	02.4	161 50.6	13.3	256 34.2	02.7	307 26.7	25.9	Pollux	243 19.2	N27 58.3						
	04 301 30.0	191 56.5	02.0	176 51.5	12.9	271 36.1	02.9	322 29.0	25.8	Procyon	244 52.5	N 5 09.9						
	05 316 32.5	206 56.2	01.7	191 52.5	12.6	286 38.0	03.0	337 31.4	25.8									
	06 331 35.0	221 55.8	N25 01.3	206 53.5	N21 12.2	301 40.0	N11 03.2	352 33.8	S10 25.8	Rasalhague	95 59.5	N12 32.5						
	07 346 37.4	236 55.5	01.0	221 54.5	11.9	316 41.9	03.4	7 36.1	25.7	Regulus	207 35.9	N11 51.2						
	08 1 39.9	251 55.1	00.6	236 55.4	11.5	331 43.8	03.6	22 38.5	25.7	Rigel	281 05.5	S 8 10.5						
	09 16 42.4	266 54.8	25 00.2	251 56.4	11.2	346 45.7	03.8	37 40.9	25.7	Rigel Kent.	139 41.6	S60 56.0						
	10 31 44.8	281 54.4	24 59.9	266 57.4	10.8	1 47.7	04.0	52 43.2	25.7	Sabik	102 04.0	S15 45.3						
	11 46 47.3	296 54.1	59.5	281 58.3	10.5	16 49.6	04.2	67 45.6	25.6									
	12 61 49.8	311 53.8	N24 59.1	296 59.3	N21 10.2	31 51.5	N11 04.4	82 48.0	S10 25.6	Schedar	349 33.0	N56 39.6						
	13 76 52.2	326 53.4	58.8	312 00.3	09.8	46 53.5	04.6	97 50.3	25.6	Shaula	96 11.8	S37 07.2						
	14 91 54.7	341 53.1	58.4	327 01.3	09.5	61 55.4	04.8	112 52.7	25.5	Sirius	258 27.7	S16 45.0						
	15 106 57.1	356 52.7	58.0	342 02.2	09.1	76 57.3	04.9	127 55.1	25.5	Spica	158 23.5	S11 17.1						
	16 121 59.6	11 52.4	57.7	357 03.2	08.8	91 59.3	05.1	142 57.4	25.5	Suhail	222 47.5	S43 31.8						
	17 137 02.1	26 52.1	57.3	12 04.2	08.4	107 01.2	05.3	157 59.8	25.5									
	18 152 04.5	41 51.7	N24 56.9	27 05.2	N21 08.1	122 03.1	N11 05.5	173 02.2	S10 25.4	Vega	80 33.8	N38 48.1						
	19 167 07.0	56 51.4	56.5	42 06.1	07.7	137 05.1	05.7	188 04.5	25.4	Zuben'ubi	136 57.2	S16 08.4						
	20 182 09.5	71 51.1	56.2	57 07.1	07.4	152 07.0	05.9	203 06.9	25.4									
	21 197 11.9	86 50.7	55.8	72 08.1	07.0	167 08.9	06.1	218 09.3	25.4									
	22 212 14.4	101 50.4	55.4	87 09.0	06.7	182 10.9	06.3	233 11.7	25.3	Venus	251 45.5	15 12						
	23 227 16.9	116 50.1	55.0	102 10.0	06.3	197 12.8	06.5	248 14.0	25.3	Mars	236 03.3	16 13						
											Jupiter	330 21.0	9 56					
										Saturn	21 01.8	6 33						
	Mer. Pass.	7 57.3	v −0.4 d 0.3	v 1.0 d 0.3	v 1.9 d 0.2	v 2.4 d 0.0												

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	°	Dec	d	HP	Naut.		Civil	22		23	24	25	
d h	° /	° /	° /	° /	° /	° /	° /	°	h m	h m	h m	h m	h m	h m	h m	h m
MONDAY	22 00	180 50.5	N20 17.5	151 23.6	8.4	N27 39.9	2.0 55.4	N 72	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00
	01	195 50.5	18.0	165 51.0	8.5	27 41.9	1.9 55.4	N 70	00 00	00 00	00 56	00 00	00 00	00 00	00 00	00 00
	02	210 50.4	18.5	180 18.5	8.4	27 43.8	1.7 55.3	66	00 00	00 00	01 51	00 00	00 00	00 00	05 32	05 32
	03	225 50.4	19.0	194 45.9	8.5	27 45.5	1.6 55.3	64	00 00	00 00	02 23	00 00	00 00	00 00	06 31	06 31
	04	240 50.3	19.5	209 13.4	8.4	27 47.1	1.4 55.3	62	00 00	01 16	02 47	02 40	03 36	05 21	07 04	07 04
	05	255 50.3	20.0	223 40.8	8.5	27 48.5	1.2 55.3	60	00 00	01 54	03 06	03 41	04 37	05 59	07 29	07 29
	06	270 50.2	N20 20.5	238 08.3	8.5	N27 49.7	1.2 55.3	N 58	00 00	02 21	03 21	04 15	05 11	06 25	07 48	07 48
	07	285 50.2	21.0	252 35.8	8.6	27 50.9	0.9 55.2	56	01 09	02 41	03 34	04 40	05 36	06 46	08 04	08 04
	08	300 50.1	21.5	267 03.4	8.5	27 51.8	0.9 55.2	54	01 44	02 57	03 46	05 00	05 56	07 03	08 18	08 18
	09	315 50.1	22.0	281 30.9	8.6	27 52.7	0.6 55.2	52	02 08	03 11	03 56	05 17	06 12	07 18	08 30	08 30
	10	330 50.0	22.5	295 58.5	8.5	27 53.3	0.6 55.2	50	02 28	03 24	04 05	05 32	06 27	07 31	08 40	08 40
	11	345 50.0	22.9	310 26.0	8.6	27 53.9	0.3 55.2	45	03 03	03 48	04 23	06 01	06 56	07 57	09 02	09 02
	12	0 49.9	N20 23.4	324 53.6	8.7	N27 54.2	0.3 55.1	N 40	03 28	04 07	04 39	06 24	07 18	08 18	09 20	09 20
	13	15 49.9	23.9	339 21.3	8.6	27 54.5	0.1 55.1	35	03 48	04 23	04 51	06 43	07 37	08 35	09 34	09 34
	14	30 49.8	24.4	353 48.9	8.7	27 54.6	0.1 55.1	30	04 04	04 36	05 03	06 59	07 53	08 50	09 47	09 47
	15	45 49.8	24.9	8 16.6	8.7	27 54.5	0.2 55.1	20	04 29	04 58	05 22	07 27	08 21	09 15	10 09	10 09
	16	60 49.7	25.4	22 44.3	8.7	27 54.3	0.3 55.1	N 10	04 49	05 15	05 38	07 51	08 44	09 37	10 28	10 28
	17	75 49.7	25.9	37 12.0	8.8	27 54.0	0.5 55.0	0	05 05	05 31	05 53	08 13	09 06	09 57	10 45	10 45
	18	90 49.7	N20 26.4	51 39.8	8.8	N27 53.5	0.7 55.0	S 10	05 20	05 46	06 08	08 35	09 28	10 17	11 03	11 03
	19	105 49.6	26.9	66 07.6	8.8	27 52.8	0.7 55.0	20	05 34	06 01	06 24	08 59	09 51	10 39	11 21	11 21
	20	120 49.6	27.4	80 35.4	8.9	27 52.1	1.0 55.0	30	05 48	06 17	06 43	09 27	10 18	11 04	11 43	11 43
	21	135 49.5	27.8	95 03.3	8.9	27 51.1	1.0 55.0	35	05 55	06 26	06 53	09 43	10 34	11 18	11 55	11 55
	22	150 49.5	28.3	109 31.2	9.0	27 50.1	1.2 54.9	40	06 02	06 36	07 05	10 02	10 53	11 35	12 09	12 09
	23	165 49.4	28.8	123 59.2	8.9	27 48.9	1.4 54.9	45	06 11	06 47	07 19	10 26	11 15	11 55	12 26	12 26
	TUESDAY	23 00	180 49.4	N20 29.3	138 27.1	9.1	N27 47.5	1.5 54.9	S 50	06 20	07 00	07 37	10 56	11 44	12 20	12 47
01		195 49.3	29.8	152 55.2	9.0	27 46.0	1.6 54.9	52	06 24	07 06	07 45	11 10	11 58	12 33	12 57	12 57
02		210 49.3	30.3	167 23.2	9.1	27 44.4	1.8 54.9	54	06 28	07 13	07 54	11 28	12 14	12 47	13 08	13 08
03		225 49.2	30.8	181 51.3	9.2	27 42.6	1.9 54.9	56	06 33	07 20	08 04	11 48	12 34	13 03	13 21	13 21
04		240 49.1	31.2	196 19.5	9.2	27 40.7	2.1 54.8	58	06 38	07 28	08 16	12 14	12 58	13 22	13 35	13 35
05		255 49.1	31.7	210 47.7	9.2	27 38.6	2.2 54.8	S 60	06 44	07 38	08 30	12 51	13 29	13 46	13 52	13 52
06		270 49.0	N20 32.2	225 15.9	9.3	N27 36.4	2.3 54.8	Lat.	Sunset	Twilight		Moonset				
07		285 49.0	32.7	239 44.2	9.3	27 34.1	2.5 54.8			Civil	Naut.	22	23	24	25	
08		300 48.9	33.2	254 12.5	9.4	27 31.6	2.6 54.8	°	h m	h m	h m	h m	h m	h m	h m	h m
09		315 48.9	33.6	268 40.9	9.5	27 29.0	2.7 54.8									
10		330 48.8	34.1	283 09.4	9.4	27 26.3	2.9 54.7	N 72	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00
11		345 48.8	34.6	297 37.8	9.6	27 23.4	3.0 54.7	N 70	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00
12		0 48.7	N20 35.1	312 06.4	9.6	N27 20.4	3.1 54.7	68	23 06	00 00	00 00	00 00	00 00	00 00	00 00	00 00
13		15 48.7	35.6	326 35.0	9.6	27 17.3	3.3 54.7	66	22 06	00 00	00 00	00 00	00 00	00 00	03 45	03 45
14		30 48.6	36.0	341 03.6	9.7	27 14.0	3.4 54.7	64	21 33	00 00	00 00	00 00	00 00	00 00	02 46	02 46
15		45 48.6	36.5	355 32.3	9.8	27 10.6	3.6 54.7	62	21 08	22 42	00 00	01 15	02 11	02 14	02 12	02 12
16		60 48.5	37.0	10 01.1	9.8	27 07.0	3.7 54.7	60	20 49	22 02	00 00	00 14	01 09	01 36	01 47	01 47
17		75 48.5	37.5	24 29.9	9.9	27 03.3	3.8 54.6	N 58	20 34	21 35	00 00	24 36	00 36	01 09	01 27	01 27
18		90 48.4	N20 37.9	38 58.8	9.9	N26 59.5	3.9 54.6	56	20 20	21 14	22 49	24 11	00 11	00 48	01 11	01 11
19		105 48.4	38.4	53 27.7	10.0	26 55.6	4.1 54.6	54	20 09	20 57	22 12	23 51	24 30	00 30	00 57	00 57
20		120 48.3	38.9	67 56.7	10.1	26 51.5	4.2 54.6	52	19 59	20 43	21 47	23 34	24 15	00 15	00 44	00 44
21		135 48.2	39.4	82 25.8	10.1	26 47.3	4.3 54.6	50	19 50	20 31	21 27	23 20	24 02	00 02	00 33	00 33
22		150 48.2	39.8	96 54.9	10.1	26 43.0	4.5 54.6	45	19 31	20 06	20 52	22 50	23 35	24 10	00 10	00 10
23		165 48.1	40.3	111 24.0	10.3	26 38.5	4.6 54.6	N 40	19 15	19 47	20 26	22 27	23 14	23 52	24 23	24 23
WEDNESDAY		24 00	180 48.1	N20 40.8	125 53.3	10.3	N26 33.9	4.7 54.5	35	19 02	19 31	20 06	22 08	22 56	23 36	24 11
	01	195 48.0	41.2	140 22.6	10.4	26 29.2	4.8 54.5	30	18 51	19 18	19 50	21 52	22 41	23 23	23 59	23 59
	02	210 48.0	41.7	154 52.0	10.4	26 24.4	4.9 54.5	20	18 32	18 56	19 25	21 24	22 15	23 00	23 40	23 40
	03	225 47.9	42.2	169 21.4	10.5	26 19.5	5.1 54.5	N 10	18 16	18 38	19 05	21 01	21 52	22 40	23 23	23 23
	04	240 47.8	42.6	183 50.9	10.6	26 14.4	5.2 54.5	0	18 00	18 22	18 48	20 39	21 31	22 21	23 07	23 07
	05	255 47.8	43.1	198 20.5	10.6	26 09.2	5.4 54.5	S 10	17 45	18 08	18 33	20 16	21 10	22 02	22 52	22 52
	06	270 47.7	N20 43.6	212 50.1	10.7	N26 03.8	5.4 54.5	20	17 29	17 53	18 20	19 52	20 47	21 41	22 34	22 34
	07	285 47.7	44.0	227 19.8	10.7	25 58.4	5.6 54.5	30	17 11	17 36	18 06	19 25	20 20	21 18	22 15	22 15
	08	300 47.6	44.5	241 49.5	10.9	25 52.8	5.6 54.4	35	17 00	17 28	17 59	19 08	20 05	21 04	22 03	22 03
	09	315 47.6	45.0	256 19.4	10.9	25 47.2	5.8 54.4	40	16 48	17 18	17 51	18 49	19 46	20 47	21 50	21 50
	10	330 47.5	45.4	270 49.3	10.9	25 41.4	6.0 54.4	45	16 34	17 06	17 42	18 26	19 24	20 28	21 34	21 34
	11	345 47.4	45.9	285 19.2	11.1	25 35.4	6.0 54.4	S 50	16 16	16 53	17 33	17 56	18 56	20 04	21 14	21 14
	12	0 47.4	N20 46.4	299 49.3	11.1	N25 29.4	6.2 54.4	52	16 08	16 47	17 29	17 41	18 42	19 52	21 05	21 05
	13	15 47.3	46.8	314 19.4	11.2	25 23.2	6.2 54.4	54	15 59	16 40	17 25	17 24	18 26	19 38	20 54	20 54
	14	30 47.3	47.3	328 49.6	11.2	25 17.0	6.4 54.4	56	15 49	16 33	17 20	17 03	18 07	19 22	20 42	20 42
	15	45 47.2	47.8	343 19.8	11.3	25 10.6	6.5 54.4	58	15 37	16 25	17 15	16 37	17 43	19 04	20 28	20 28
	16	60 47.2	48.2	357 50.1	11.4	25 04.1	6.6 54.4	S 60	15 23	16 15	17 09	16 01	17 12	18 40	20 12	20 12
	17	75 47.1	48.7	12 20.5	11.5	24 57.5	6.7 54.4	Day	Eqn. of Time	Mer. Pass.	MOON		Age	Phase		
	18	90 47.0	N20 49.1	26 51.0	11.5	N24 50.8	6.9 54.3				Mer.	Mer.				
	19	105 47.0	49.6	41 21.5	11.6	24 43.9	6.9 54.3	00 ^h	12 ^h							

106		2023 MAY 25, 26, 27 (THURS., FRI., SAT.)													
UT		ARIES		VENUS -4.3		MARS +1.5		JUPITER -2.1		SATURN +0.8		STARS			
		GHA		GHA Dec		GHA Dec		GHA Dec		GHA Dec		Name		SHA Dec	
d h		° ' "		° ' "		° ' "		° ' "		° ' "					
T H U R S D A Y	25 00	242 19.3	131 49.7 N24	54.7	117 11.0 N21	06.0	212 14.7 N11	06.6	263 16.4 S10	25.3	Acamar	315 13.2 S40	12.6		
	01	257 21.8	146 49.4	54.3	132 12.0	05.6	227 16.7	06.8	278 18.8	25.2	Achernar	335 21.7 S57	07.0		
	02	272 24.3	161 49.1	53.9	147 12.9	05.3	242 18.6	07.0	293 21.1	25.2	Acrux	173 01.2 S63	14.0		
	03	287 26.7	176 48.8	53.5	162 13.9	04.9	257 20.5	07.2	308 23.5	25.2	Adhara	255 07.2 S29	00.3		
	04	302 29.2	191 48.4	53.1	177 14.9	04.5	272 22.5	07.4	323 25.9	25.2	Aldebaran	290 41.5 N16	33.3		
	05	317 31.6	206 48.1	52.8	192 15.9	04.2	287 24.4	07.6	338 28.2	25.1					
	06	332 34.1	221 47.8 N24	52.4	207 16.8 N21	03.8	302 26.3 N11	07.8	353 30.6 S10	25.1	Alioth	166 13.8 N55	50.2		
	07	347 36.6	236 47.5	52.0	222 17.8	03.5	317 28.3	08.0	8 33.0	25.1	Alkaid	152 52.7 N49	11.9		
	08	2 39.0	251 47.1	51.6	237 18.8	03.1	332 30.2	08.1	23 35.4	25.1	Alnair	27 34.6 S46	50.7		
	09	17 41.5	266 46.8	51.2	252 19.7	02.8	347 32.1	08.3	38 37.7	25.0	Alnilam	275 39.4 S 1	11.3		
	10	32 44.0	281 46.5	50.8	267 20.7	02.4	2 34.1	08.5	53 40.1	25.0	Alphard	217 49.2 S 8	45.6		
	11	47 46.4	296 46.2	50.4	282 21.7	02.1	17 36.0	08.7	68 42.5	25.0					
	12	62 48.9	311 45.9 N24	50.0	297 22.7 N21	01.7	32 37.9 N11	08.9	83 44.8 S10	24.9	Alphecca	126 04.5 N26	38.2		
	13	77 51.4	326 45.5	49.7	312 23.6	01.4	47 39.9	09.1	98 47.2	24.9	Alpheratz	357 36.4 N29	12.9		
	14	92 53.8	341 45.2	49.3	327 24.6	01.0	62 41.8	09.3	113 49.6	24.9	Altair	62 01.1 N 8	55.7		
	15	107 56.3	356 44.9	48.9	342 25.6	00.7	77 43.7	09.5	128 52.0	24.9	Ankaa	353 08.7 S42	10.6		
	16	122 58.7	11 44.6	48.5	357 26.6	00.3	92 45.7	09.6	143 54.3	24.8	Antares	112 17.1 S26	29.1		
	17	138 01.2	26 44.3	48.1	12 27.5 21	00.0	107 47.6	09.8	158 56.7	24.8					
	18	153 03.7	41 44.0 N24	47.7	27 28.5 N20	59.6	122 49.5 N11	10.0	173 59.1 S10	24.8	Arcturus	145 48.9 N19	03.7		
	19	168 06.1	56 43.6	47.3	42 29.5	59.2	137 51.5	10.2	189 01.5	24.8	Atria	107 12.0 S69	04.1		
	20	183 08.6	71 43.3	46.9	57 30.4	58.9	152 53.4	10.4	204 03.8	24.7	Avior	234 15.6 S59	35.3		
	21	198 11.1	86 43.0	46.5	72 31.4	58.5	167 55.3	10.6	219 06.2	24.7	Bellatrix	278 24.7 N 6	22.2		
	22	213 13.5	101 42.7	46.1	87 32.4	58.2	182 57.3	10.8	234 08.6	24.7	Betelgeuse	270 53.9 N 7	24.7		
	23	228 16.0	116 42.4	45.7	102 33.4	57.8	197 59.2	11.0	249 10.9	24.7					
	26	00	243 18.5	131 42.1 N24	45.3	117 34.3 N20	57.5	213 01.1 N11	11.2	264 13.3 S10	24.6	Canopus	263 53.5 S52	42.6	
01		258 20.9	146 41.8	44.9	132 35.3	57.1	228 03.1	11.3	279 15.7	24.6	Capella	280 24.4 N46	01.3		
02		273 23.4	161 41.5	44.5	147 36.3	56.7	243 05.0	11.5	294 18.1	24.6	Deneb	49 26.5 N45	21.5		
03		288 25.9	176 41.2	44.1	162 37.3	56.4	258 06.9	11.7	309 20.4	24.6	Denebola	182 26.2 N14	26.6		
04		303 28.3	191 40.9	43.7	177 38.2	56.0	273 08.9	11.9	324 22.8	24.5	Diphda	348 48.9 S17	51.5		
05		318 30.8	206 40.6	43.3	192 39.2	55.7	288 10.8	12.1	339 25.2	24.5					
06		333 33.2	221 40.3 N24	42.9	207 40.2 N20	55.3	303 12.7 N11	12.3	354 27.6 S10	24.5	Dubhe	193 42.6 N61	37.8		
07		348 35.7	236 40.0	42.5	222 41.2	55.0	318 14.7	12.5	9 29.9	24.5	Elnath	278 04.0 N28	37.6		
08		3 38.2	251 39.7	42.1	237 42.1	54.6	333 16.6	12.6	24 32.3	24.4	Eltanin	90 42.3 N51	29.0		
09		18 40.6	266 39.4	41.7	252 43.1	54.2	348 18.5	12.8	39 34.7	24.4	Enif	33 40.1 N 9	58.8		
10		33 43.1	281 39.1	41.2	267 44.1	53.9	3 20.5	13.0	54 37.1	24.4	Fomalhaut	15 16.1 S29	29.8		
11		48 45.6	296 38.8	40.8	282 45.0	53.5	18 22.4	13.2	69 39.4	24.4					
12		63 48.0	311 38.5 N24	40.4	297 46.0 N20	53.2	33 24.3 N11	13.4	84 41.8 S10	24.3	Gacrux	171 52.9 S57	14.9		
13		78 50.5	326 38.2	40.0	312 47.0	52.8	48 26.3	13.6	99 44.2	24.3	Gienah	175 44.8 S17	40.4		
14		93 53.0	341 37.9	39.6	327 48.0	52.4	63 28.2	13.8	114 46.6	24.3	Hadar	148 37.4 S60	29.3		
15		108 55.4	356 37.6	39.2	342 48.9	52.1	78 30.2	14.0	129 48.9	24.3	Hamal	327 53.0 N23	34.2		
16		123 57.9	11 37.3	38.8	357 49.9	51.7	93 32.1	14.1	144 51.3	24.2	Kaus Aust.	83 34.0 S34	22.4		
17		139 00.4	26 37.0	38.3	12 50.9	51.4	108 34.0	14.3	159 53.7	24.2					
18		154 02.8	41 36.7 N24	37.9	27 51.9 N20	51.0	123 36.0 N11	14.5	174 56.1 S10	24.2	Kochab	137 18.7 N74	03.7		
19		169 05.3	56 36.4	37.5	42 52.8	50.6	138 37.9	14.7	189 58.5	24.2	Markab	13 31.3 N15	19.7		
20		184 07.7	71 36.2	37.1	57 53.8	50.3	153 39.8	14.9	205 00.8	24.1	Menkar	314 07.9 N 4	10.8		
21		199 10.2	86 35.9	36.7	72 54.8	49.9	168 41.8	15.1	220 03.2	24.1	Menkent	147 58.9 S36	29.2		
22		214 12.7	101 35.6	36.3	87 55.8	49.6	183 43.7	15.3	235 05.6	24.1	Miaplacidus	221 38.9 S69	49.0		
23		229 15.1	116 35.3	35.8	102 56.7	49.2	198 45.6	15.4	250 08.0	24.1					
27	00	244 17.6	131 35.0 N24	35.4	117 57.7 N20	48.8	213 47.6 N11	15.6	265 10.3 S10	24.0	Mirfak	308 30.7 N49	56.5		
	01	259 20.1	146 34.7	35.0	132 58.7	48.5	228 49.5	15.8	280 12.7	24.0	Nunki	75 49.2 S26	16.0		
	02	274 22.5	161 34.5	34.6	147 59.7	48.1	243 51.4	16.0	295 15.1	24.0	Peacock	53 07.6 S56	39.4		
	03	289 25.0	176 34.2	34.1	163 00.6	47.8	258 53.4	16.2	310 17.5	24.0	Pollux	243 19.2 N27	58.3		
	04	304 27.5	191 33.9	33.7	178 01.6	47.4	273 55.3	16.4	325 19.8	23.9	Procyon	244 52.5 N 5	09.9		
	05	319 29.9	206 33.6	33.3	193 02.6	47.0	288 57.3	16.6	340 22.2	23.9					
	06	334 32.4	221 33.3 N24	32.9	208 03.5 N20	46.7	303 59.2 N11	16.7	355 24.6 S10	23.9	Rasalhague	95 59.5 N12	32.5		
	07	349 34.9	236 33.1	32.4	223 04.5	46.3	319 01.1	16.9	10 27.0	23.9	Regulus	207 35.9 N11	51.2		
	08	4 37.3	251 32.8	32.0	238 05.5	45.9	334 03.1	17.1	25 29.4	23.8	Rigel	281 05.5 S 8	10.5		
	09	19 39.8	266 32.5	31.6	253 06.5	45.6	349 05.0	17.3	40 31.7	23.8	Rigel Kent.	139 41.6 S60	56.0		
	10	34 42.2	281 32.2	31.1	268 07.4	45.2	4 06.9	17.5	55 34.1	23.8	Sabik	102 04.0 S15	45.3		
	11	49 44.7	296 32.0	30.7	283 08.4	44.9	19 08.9	17.7	70 36.5	23.8					
	12	64 47.2	311 31.7 N24	30.3	298 09.4 N20	44.5	34 10.8 N11	17.9	85 38.9 S10	23.7	Schedar	349 32.9 N56	39.6		
	13	79 49.6	326 31.4	29.8	313 10.4	44.1	49 12.8	18.0	100 41.3	23.7	Shaula	96 11.8 S37	07.2		
	14	94 52.1	341 31.1	29.4	328 11.3	43.8	64 14.7	18.2	115 43.6	23.7	Sirius	258 27.7 S16	45.0		
	15	109 54.6	356 30.9	29.0	343 12.3	43.4	79 16.6	18.4	130 46.0	23.7	Spica	158 23.5 S11	17.1		
	16	124 57.0	11 30.6	28.5	358 13.3	43.0	94 18.6	18.6	145 48.4	23.6	Suhail	222 47.5 S43	31.8		
	17	139 59.5	26 30.3	28.1	13 14.3	42.7	109 20.5	18.8	160 50.8	23.6					
	18	155 02.0	41 30.1 N24	27.7	28 15.2 N20	42.3	124 22.4 N11	19.0	175 53.2 S10	23.6	Vega	80 33.8 N38	48.1		
	19	170 04.4	56 29.8	27.2	43 16.2	41.9	139 24.4	19.2	190 55.5	23.6	Zuben'ubi	136 57.2 S16	08.4		
	20	185 06.9	71 29.5	26.8	58 17.2	41.6	154 26.3	19.3	205 57.9	23.6					
	21	200 09.3	86 29.3	26.3	73 18.2	41.2	169 28.3	19.5	221 00.3	23.5					
	22	215 11.8	101 29.0	25.9	88 19.1	40.8	184 30.2	19.7	236 02.7	23.5	Venus	248 23.6 15	14		
	23	230 14.3	116 28.8	25.5	103 20.1	40.5	199 32.1	19.9	251 05.1	23.5	Mars	234 15.9 16	09		
Mer.Pass. 7 45.5		v -0.3 d 0.4		v 1.0 d 0.4		v 1.9 d 0.2		v 2.4 d 0.0		Saturn		20 54.9 6 22			

UT	SUN				MOON							Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil		25	26	27	28					
	°	'			°	'		°	'															
25 T H U R S D A Y	d	h	°	'	N20	51.9	113	55.2	12.0	N24	08.2	7.5	54.3	N 72	□	□	□	□	□	□	08 32	10 54		
	00	180	46.7											N 70	□	□	□	□	□	06 10	09 06	11 09		
	01	195	46.6											68	////	////	00 22	□	□	07 21	09 30	11 20		
	02	210	46.6											66	////	////	01 39	05 32	07 57	09 48	11 30			
	03	225	46.5			53.2				157	28.3	12.2	23 45.4	7.8	54.3	64	////	////	02 15	06 31	08 22	10 03	11 38	
	04	240	46.4			53.7				171	59.5	12.2	23 37.6	7.9	54.3	62	////	01 00	02 40	07 04	08 42	10 15	11 44	
	05	255	46.4			54.2				186	30.7	12.4	23 29.7	8.0	54.3	60	////	01 45	03 00	07 29	08 58	10 26	11 50	
	06	270	46.3	N20	54.6					201	02.1	12.3	N23 21.7	8.0	54.3	N 58	////	02 14	03 16	07 48	09 12	10 35	11 55	
	07	285	46.2			55.1				215	33.4	12.5	23 13.7	8.2	54.3	56	00 54	02 35	03 30	08 04	09 24	10 42	12 00	
	08	300	46.2			55.5				230	04.9	12.5	23 05.5	8.3	54.3	54	01 36	02 53	03 42	08 18	09 34	10 49	12 04	
	09	315	46.1			56.0				244	36.4	12.6	22 57.2	8.4	54.2	52	02 02	03 07	03 52	08 30	09 43	10 56	12 08	
	10	330	46.1			56.4				259	08.0	12.7	22 48.8	8.5	54.2	50	02 22	03 20	04 01	08 40	09 51	11 01	12 11	
	11	345	46.0			56.9				273	39.7	12.8	22 40.3	8.6	54.2	45	02 59	03 45	04 21	09 02	10 08	11 13	12 18	
	12		0	45.9	N20	57.3				288	11.5	12.8	N22 31.7	8.7	54.2	N 40	03 25	04 05	04 37	09 20	10 22	11 23	12 24	
	13		15	45.9		57.7				302	43.3	12.9	22 23.0	8.7	54.2	35	03 46	04 21	04 50	09 34	10 34	11 32	12 29	
	14		30	45.8		58.2				317	15.2	12.9	22 14.3	8.9	54.2	30	04 02	04 35	05 01	09 47	10 44	11 39	12 34	
	15		45	45.7		58.6				331	47.1	13.0	22 05.4	9.0	54.2	20	04 28	04 57	05 21	10 09	11 01	11 52	12 42	
	16		60	45.7		59.1				346	19.1	13.1	21 56.4	9.0	54.2	N 10	04 49	05 15	05 38	10 28	11 16	12 03	12 48	
	17		75	45.6	20	59.5				0	51.2	13.2	21 47.4	9.1	54.2	0	05 06	05 31	05 53	10 45	11 31	12 13	12 55	
	18		90	45.5	N21	00.0				15	23.4	13.2	N21 38.3	9.3	54.2	S 10	05 21	05 47	06 09	11 03	11 45	12 24	13 01	
	19		105	45.5		00.4				29	55.6	13.3	21 29.0	9.3	54.2	20	05 35	06 02	06 25	11 21	12 00	12 35	13 08	
	20		120	45.4		00.9				44	27.9	13.4	21 19.7	9.4	54.2	30	05 49	06 18	06 44	11 43	12 17	12 47	13 15	
	21		135	45.3		01.3				59	00.3	13.4	21 10.3	9.5	54.2	35	05 57	06 28	06 55	11 55	12 27	12 55	13 20	
	22		150	45.3		01.7				73	32.7	13.5	21 00.8	9.6	54.2	40	06 05	06 38	07 08	12 09	12 38	13 03	13 25	
	23		165	45.2		02.2				88	05.2	13.6	20 51.2	9.6	54.2	45	06 13	06 50	07 22	12 26	12 51	13 12	13 30	
26 F R I D A Y	00	180	45.2	N21	02.6				102	37.8	13.6	N20 41.6	9.8	54.2	S 50	06 23	07 03	07 40	12 47	13 07	13 24	13 37		
	01	195	45.1		03.1				117	10.4	13.7	20 31.8	9.8	54.2	52	06 27	07 10	07 49	12 57	13 15	13 29	13 40		
	02	210	45.0		03.5				131	43.1	13.7	20 22.0	10.0	54.2	54	06 32	07 17	07 58	13 08	13 23	13 35	13 44		
	03	225	45.0		03.9				146	15.8	13.9	20 12.0	10.0	54.2	56	06 37	07 24	08 09	13 21	13 33	13 41	13 48		
	04	240	44.9		04.4				160	48.7	13.8	20 02.0	10.1	54.2	58	06 42	07 33	08 21	13 35	13 43	13 48	13 52		
	05	255	44.8		04.8				175	21.5	14.0	19 51.9	10.1	54.2	S 60	06 48	07 43	08 35	13 52	13 55	13 56	13 57		
	06	270	44.8	N21	05.3				189	54.5	14.0	N19 41.8	10.3	54.2		Lat.	Sunset	Twilight		Moonset				
	07	285	44.7		05.7				204	27.5	14.1	19 31.5	10.3	54.2				Civil	Naut.	25	26	27	28	
	08	300	44.6		06.1				219	00.6	14.1	19 21.2	10.4	54.2										
	09	315	44.6		06.6				233	33.7	14.2	19 10.8	10.5	54.2										
	10	330	44.5		07.0				248	06.9	14.3	19 00.3	10.5	54.2										
	11	345	44.4		07.4				262	40.2	14.3	18 49.8	10.7	54.2										
	12		0	44.3	N21	07.9				277	13.5	14.4	N18 39.1	10.7	54.2	N 72	□	□	□	□	□	03 55	03 01	
	13		15	44.3		08.3				291	46.9	14.4	18 28.4	10.8	54.2	N 70	□	□	□	□	□	04 46	03 20	02 44
	14		30	44.2		08.7				306	20.3	14.5	18 17.6	10.8	54.2	66	22 19	////	////	03 45	02 56	02 35	02 20	
	15		45	44.1		09.2				320	53.8	14.5	18 06.8	11.0	54.2	64	21 42	////	////	02 46	02 30	02 19	02 10	
	16		60	44.1		09.6				335	27.3	14.6	17 55.8	11.0	54.2	62	21 16	23 00	////	02 12	02 09	02 06	02 02	
	17		75	44.0		10.0				350	00.9	14.7	17 44.8	11.1	54.2	60	20 56	22 12	////	01 47	01 52	01 54	01 55	
	18		90	43.9	N21	10.5				4	34.6	14.7	N17 33.7	11.1	54.2	N 58	20 39	21 42	////	01 27	01 38	01 44	01 49	
	19		105	43.9		10.9				19	08.3	14.8	17 22.6	11.2	54.3	56	20 25	21 20	23 05	01 11	01 26	01 36	01 43	
	20		120	43.8		11.3				33	42.1	14.8	17 11.4	11.3	54.3	54	20 13	21 03	22 21	00 57	01 15	01 28	01 38	
	21		135	43.7		11.7				48	15.9	14.9	17 00.1	11.4	54.3	52	20 03	20 48	21 54	00 44	01 05	01 21	01 34	
	22		150	43.7		12.2				62	49.8	14.9	16 48.7	11.4	54.3	50	19 53	20 35	21 33	00 33	00 57	01 15	01 29	
	23		165	43.6		12.6				77	23.7	15.0	16 37.3	11.5	54.3	45	19 34	20 10	20 56	00 10	00 38	01 01	01 20	
	27 S A T U R D A Y	00	180	43.5	N21	13.0				91	57.7	15.0	N16 25.8	11.6	54.3	N 40	19 18	19 50	20 29	24 23	00 23	00 50	01 13	
01		195	43.4		13.4				106	31.7	15.1	16 14.2	11.6	54.3	35	19 05	19 33	20 09	24 11	00 11	00 40	01 06		
02		210	43.4		13.9				121	05.8	15.1	16 02.6	11.7	54.3	30	18 53	19 20	19 52	23 59	24 32	00 32	01 01		
03		225	43.3		14.3				135	39.9	15.2	15 50.9	11.7	54.3	20	18 33	18 57	19 26	23 40	24 17	00 17	00 51		
04		240	43.2		14.7				150	14.1	15.2	15 39.2	11.9	54.3	N 10	18 16	18 39	19 06	23 23	24 04	00 04	00 42		
05		255	43.2		15.1				164	48.3	15.3	15 27.3	11.9	54.3	0	18 01	18 23	18 49	23 07	23 52	24 33	00 33		
06		270	43.1	N21	15.6				179	22.6	15.3	N15 15.4	11.9	54.3	S 10	17 45	18 08	18 33	22 52	23 39	24 25	00 25		
07		285	43.0		16.0				193	56.9	15.3	15 03.5	12.0	54.3	20	17 28	17 52	18 19	22 34	23 26	24 16	00 16		
08		300	42.9		16.4				208	31.2	15.4	14 51.5	12.1	54.3	30	17 10	17 35	18 05	22 15	23 11	24 06	00 06		
09		315	42.9		16.8				223	05.6	15.5	14 39.4	12.1	54.4	35	16 59	17 26	17 57	22 03	23 02	24 00	00 00		
10		330	42.8		17.2				237	40.1	15.4	14 27.3	12.2	54.4	40	16 46	17 16	17 49	21 50	22 52	23 53	24 54		
11		345	42.7		17.7				252	14.5	15.6	14 15.1	12.2	54.4	45	16 31	17 04	17 41	21 34	22 39	23 45	24 49		
12			0	42.7	N21	18.1				266	49.1	15.5	N14 02.9	12.3	54.4	S 50	16 13	16 50	17 31	21 14	22 25	23 35	24 45	
13			15	42.6		18.5				281	23.6	15.6	13 50.6	12.4	54.4	52	16 05	16 44	17 26	21 05	22 18	23 30	24 42	
14			30	42.5		18.9				295	58.2	15.6	13 38.2	12.4	54.4	54	15 55	16 37	17 22	20 54	22 10	23 25	24 40	
15			45	42.4		19.3				310	32.8	15.7	13 25.8	12.5	54.4	56	15 45	16 29	17 17	20 42	22 02	23 20	24 37	
16			60	42.4		19.7				325	07.5	15.7	13 13.3	12.5	54.4	58	15 32	16 21	17 11	20 28	21 52	23 13	24 34	
17			75	42.3		20.1				339	42.2	15.8	13 00.8	12.6										

UT	ARIES			VENUS −4.3			MARS +1.6			JUPITER −2.1			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
SUNDAY	245 16.7	131 28.5 N24	25.0	118 21.1 N20	40.1	214 34.1 N11	20.1	266 07.4 S10	23.5	Acamar	315 13.2 S40	12.6						
	260 19.2	146 28.2	24.6	133 22.1	39.7	229 36.0	20.3	281 09.8	23.4	Achernar	335 21.6 S57	06.9						
	275 21.7	161 28.0	24.1	148 23.0	39.4	244 37.9	20.4	296 12.2	23.4	Acrux	173 01.2 S63	14.0						
	290 24.1	176 27.7	23.7	163 24.0	39.0	259 39.9	20.6	311 14.6	23.4	Adhara	255 07.2 S29	00.3						
	305 26.6	191 27.5	23.2	178 25.0	38.6	274 41.8	20.8	326 17.0	23.4	Aldebaran	290 41.5 N16	33.3						
	320 29.1	206 27.2	22.8	193 26.0	38.3	289 43.8	21.0	341 19.3	23.4									
	335 31.5	221 27.0 N24	22.3	208 26.9 N20	37.9	304 45.7 N11	21.2	356 21.7 S10	23.3	Alioth	166 13.8 N55	50.2						
	350 34.0	236 26.7	21.9	223 27.9	37.5	319 47.6	21.4	11 24.1	23.3	Alkaid	152 52.7 N49	12.0						
	5 36.5	251 26.5	21.4	238 28.9	37.2	334 49.6	21.6	26 26.5	23.3	Alnair	27 34.6 S46	50.7						
	20 38.9	266 26.2	21.0	253 29.9	36.8	349 51.5	21.7	41 28.9	23.3	Alnilam	275 39.4 S 1	11.3						
	35 41.4	281 26.0	20.5	268 30.8	36.4	4 53.5	21.9	56 31.3	23.2	Alphard	217 49.2 S 8	45.6						
	50 43.8	296 25.7	20.1	283 31.8	36.0	19 55.4	22.1	71 33.6	23.2									
	65 46.3	311 25.5 N24	19.6	298 32.8 N20	35.7	34 57.3 N11	22.3	86 36.0 S10	23.2	Alphecca	126 04.5 N26	38.2						
	80 48.8	326 25.2	19.2	313 33.7	35.3	49 59.3	22.5	101 38.4	23.2	Alpheratz	357 36.3 N29	12.9						
	95 51.2	341 25.0	18.7	328 34.7	34.9	65 01.2	22.7	116 40.8	23.2	Altair	62 01.1 N 8	55.7						
	110 53.7	356 24.7	18.2	343 35.7	34.6	80 03.2	22.8	131 43.2	23.1	Ankaa	353 08.7 S42	10.6						
	125 56.2	11 24.5	17.8	358 36.7	34.2	95 05.1	23.0	146 45.6	23.1	Antares	112 17.1 S26	29.1						
	140 58.6	26 24.2	17.3	13 37.6	33.8	110 07.0	23.2	161 47.9	23.1									
	156 01.1	41 24.0 N24	16.9	28 38.6 N20	33.5	125 09.0 N11	23.4	176 50.3 S10	23.1	Arcturus	145 48.9 N19	03.7						
	171 03.6	56 23.8	16.4	43 39.6	33.1	140 10.9	23.6	191 52.7	23.0	Atria	107 12.0 S69	04.1						
	186 06.0	71 23.5	15.9	58 40.6	32.7	155 12.9	23.8	206 55.1	23.0	Avior	234 15.7 S59	35.2						
	201 08.5	86 23.3	15.5	73 41.5	32.3	170 14.8	23.9	221 57.5	23.0	Bellatrix	278 24.7 N 6	22.2						
	216 10.9	101 23.0	15.0	88 42.5	32.0	185 16.7	24.1	236 59.9	23.0	Betelgeuse	270 53.9 N 7	24.7						
	231 13.4	116 22.8	14.6	103 43.5	31.6	200 18.7	24.3	252 02.3	23.0									
	MONDAY	246 15.9	131 22.6 N24	14.1	118 44.5 N20	31.2	215 20.6 N11	24.5	267 04.6 S10	22.9	Canopus	263 53.5 S52	42.6					
261 18.3		146 22.3	13.6	133 45.4	30.9	230 22.6	24.7	282 07.0	22.9	Capella	280 24.4 N46	01.3						
276 20.8		161 22.1	13.2	148 46.4	30.5	245 24.5	24.9	297 09.4	22.9	Deneb	49 26.5 N45	21.5						
291 23.3		176 21.9	12.7	163 47.4	30.1	260 26.4	25.0	312 11.8	22.9	Denebola	182 26.2 N14	26.6						
306 25.7		191 21.6	12.2	178 48.4	29.7	275 28.4	25.2	327 14.2	22.8	Diphda	348 48.8 S17	51.5						
321 28.2		206 21.4	11.8	193 49.3	29.4	290 30.3	25.4	342 16.6	22.8									
336 30.7		221 21.2 N24	11.3	208 50.3 N20	29.0	305 32.3 N11	25.6	357 18.9 S10	22.8	Dubhe	193 42.6 N61	37.8						
351 33.1		236 20.9	10.8	223 51.3	28.6	320 34.2	25.8	12 21.3	22.8	Elnath	278 04.0 N28	37.6						
6 35.6		251 20.7	10.3	238 52.3	28.2	335 36.1	26.0	27 23.7	22.8	Eltanin	90 42.3 N51	29.0						
21 38.1		266 20.5	09.9	253 53.2	27.9	350 38.1	26.1	42 26.1	22.7	Enif	33 40.1 N 9	58.8						
36 40.5		281 20.3	09.4	268 54.2	27.5	5 40.0	26.3	57 28.5	22.7	Fomalhaut	15 16.0 S29	29.8						
51 43.0		296 20.0	08.9	283 55.2	27.1	20 42.0	26.5	72 30.9	22.7									
66 45.4		311 19.8 N24	08.5	298 56.2 N20	26.7	35 43.9 N11	26.7	87 33.3 S10	22.7	Gacrux	171 52.9 S57	14.9						
81 47.9		326 19.6	08.0	313 57.1	26.4	50 45.8	26.9	102 35.7	22.7	Gienah	175 44.8 S17	40.4						
96 50.4		341 19.4	07.5	328 58.1	26.0	65 47.8	27.1	117 38.0	22.6	Hadar	148 37.4 S60	29.3						
111 52.8		356 19.2	07.0	343 59.1	25.6	80 49.7	27.2	132 40.4	22.6	Hamal	327 53.0 N23	34.2						
126 55.3		11 18.9	06.5	359 00.1	25.2	95 51.7	27.4	147 42.8	22.6	Kaus Aust.	83 34.0 S34	22.4						
141 57.8		26 18.7	06.1	14 01.1	24.9	110 53.6	27.6	162 45.2	22.6									
157 00.2		41 18.5 N24	05.6	29 02.0 N20	24.5	125 55.6 N11	27.8	177 47.6 S10	22.6	Kochab	137 18.7 N74	03.7						
172 02.7		56 18.3	05.1	44 03.0	24.1	140 57.5	28.0	192 50.0	22.5	Markab	13 31.3 N15	19.7						
187 05.2		71 18.1	04.6	59 04.0	23.7	155 59.4	28.2	207 52.4	22.5	Menkar	314 07.9 N 4	10.8						
202 07.6		86 17.9	04.1	74 05.0	23.4	171 01.4	28.3	222 54.8	22.5	Menkent	147 58.9 S36	29.2						
217 10.1		101 17.7	03.7	89 05.9	23.0	186 03.3	28.5	237 57.1	22.5	Miaplacidus	221 38.9 S69	49.0						
232 12.6		116 17.4	03.2	104 06.9	22.6	201 05.3	28.7	252 59.5	22.5									
TUESDAY		247 15.0	131 17.2 N24	02.7	119 07.9 N20	22.2	216 07.2 N11	28.9	268 01.9 S10	22.4	Mirfak	308 30.7 N49	56.5					
	262 17.5	146 17.0	02.2	134 08.9	21.9	231 09.1	29.1	283 04.3	22.4	Nunki	75 49.1 S26	16.0						
	277 19.9	161 16.8	01.7	149 09.8	21.5	246 11.1	29.2	298 06.7	22.4	Peacock	53 07.5 S56	39.4						
	292 22.4	176 16.6	01.2	164 10.8	21.1	261 13.0	29.4	313 09.1	22.4	Pollux	243 19.2 N27	58.3						
	307 24.9	191 16.4	00.7	179 11.8	20.7	276 15.0	29.6	328 11.5	22.4	Procyon	244 52.5 N 5	09.9						
	322 27.3	206 16.2	00.2	194 12.8	20.3	291 16.9	29.8	343 13.9	22.3									
	337 29.8	221 16.0 N23	59.8	209 13.7 N20	20.0	306 18.9 N11	30.0	358 16.3 S10	22.3	Rasalhague	95 59.5 N12	32.5						
	352 32.3	236 15.8	59.3	224 14.7	19.6	321 20.8	30.2	13 18.6	22.3	Regulus	207 35.9 N11	51.2						
	7 34.7	251 15.6	58.8	239 15.7	19.2	336 22.7	30.3	28 21.0	22.3	Rigel	281 05.5 S 8	10.5						
	22 37.2	266 15.4	58.3	254 16.7	18.8	351 24.7	30.5	43 23.4	22.3	Rigel Kent.	139 41.6 S60	56.0						
	37 39.7	281 15.2	57.8	269 17.6	18.5	6 26.6	30.7	58 25.8	22.2	Sabik	102 04.0 S15	45.3						
	52 42.1	296 15.0	57.3	284 18.6	18.1	21 28.6	30.9	73 28.2	22.2									
	67 44.6	311 14.8 N23	56.8	299 19.6 N20	17.7	36 30.5 N11	31.1	88 30.6 S10	22.2	Schedar	349 32.9 N56	39.6						
	82 47.0	326 14.6	56.3	314 20.6	17.3	51 32.5	31.2	103 33.0	22.2	Shaula	96 11.8 S37	07.2						
	97 49.5	341 14.4	55.8	329 21.5	16.9	66 34.4	31.4	118 35.4	22.2	Sirius	258 27.7 S16	45.0						
	112 52.0	356 14.2	55.3	344 22.5	16.5	81 36.3	31.6	133 37.8	22.1	Spica	158 23.5 S11	17.1						
	127 54.4	11 14.0	54.8	359 23.5	16.2	96 38.3	31.8	148 40.2	22.1	Suhail	222 47.5 S43	31.8						
	142 56.9	26 13.8	54.3	14 24.5	15.8	111 40.2	32.0	163 42.5	22.1									
	157 59.4	41 13.6 N23	53.8	29 25.4 N20	15.4	126 42.2 N11	32.1	178 44.9 S10	22.1	Vega	80 33.8 N38	48.1						
	173 01.8	56 13.5	53.3	44 26.4	15.0	141 44.1	32.3	193 47.3	22.1	Zuben'ubi	136 57.2 S16	08.4						
	188 04.3	71 13.3	52.8	59 27.4	14.6	156 46.1	32.5	208 49.7	22.1									
	203 06.8	86 13.1	52.3	74 28.4	14.3	171 48.0	32.7	223 52.1	22.0									
	218 09.2	101 12.9	51.8	89 29.4	13.9	186 50.0	32.9	238 54.5	22.0	Venus	245 06.7	15 15						
	233 11.7	116 12.7	51.3	104 30.3	13.5	201 51.9	33.1	253 56.9	22.0	Mars	232 28.6	16 04						
										Jupiter	329 04.7	9 37						
									Saturn	20 48.8	6 11							

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise							
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	28		29	30	31					
d h	° /	° /	° /	° /	° /	° /	°	h m	h m	h m	h m	h m	h m	h m	h m					
SUNDAY	28 00	180 41.8	N21 23.0	81 46.1	16.0	N11 31.6	12.9	54.5	N 72	□	□	□	10 54	12 57	14 59	17 10				
	01	195 41.7	23.4	96 21.1	15.9	11 18.7	13.0	54.5	N 70	□	□	□	11 09	13 01	14 54	16 54				
	02	210 41.6	23.9	110 56.0	16.1	11 05.7	13.1	54.6	68	□	□	□	11 20	13 05	14 50	16 41				
	03	225 41.5	24.3	125 31.1	16.0	10 52.6	13.1	54.6	66	////	////	01 26	11 30	13 08	14 47	16 31				
	04	240 41.5	24.7	140 06.1	16.1	10 39.5	13.1	54.6	64	////	////	02 06	11 38	13 10	14 44	16 22				
	05	255 41.4	25.1	154 41.2	16.0	10 26.4	13.2	54.6	62	////	00 41	02 34	11 44	13 12	14 42	16 15				
	06	270 41.3	N21 25.5	169 16.2	16.1	N10 13.2	13.2	54.6	60	////	01 36	02 55	11 50	13 14	14 40	16 09				
	07	285 41.2	25.9	183 51.3	16.2	10 00.0	13.3	54.6	N 58	////	02 07	03 12	11 55	13 16	14 38	16 03				
	08	300 41.2	26.3	198 26.5	16.1	9 46.7	13.3	54.6	56	00 37	02 30	03 26	12 00	13 17	14 36	15 58				
	09	315 41.1	26.7	213 01.6	16.2	9 33.4	13.4	54.7	54	01 27	02 48	03 38	12 04	13 19	14 35	15 54				
	10	330 41.0	27.1	227 36.8	16.2	9 20.0	13.4	54.7	52	01 56	03 03	03 49	12 08	13 20	14 33	15 50				
	11	345 40.9	27.5	242 12.0	16.2	9 06.6	13.4	54.7	50	02 18	03 16	03 59	12 11	13 21	14 32	15 46				
	12	0 40.8	N21 27.9	256 47.2	16.2	N 8 53.2	13.5	54.7	45	02 56	03 43	04 19	12 18	13 23	14 30	15 39				
	13	15 40.8	28.3	271 22.4	16.2	8 39.7	13.6	54.7	N 40	03 23	04 03	04 35	12 24	13 25	14 28	15 32				
	14	30 40.7	28.7	285 57.6	16.2	8 26.1	13.5	54.7	35	03 44	04 20	04 48	12 29	13 27	14 26	15 27				
	15	45 40.6	29.1	300 32.8	16.3	8 12.6	13.6	54.8	30	04 01	04 33	05 00	12 34	13 28	14 24	15 22				
	16	60 40.5	29.5	315 08.1	16.3	7 59.0	13.7	54.8	20	04 28	04 56	05 20	12 42	13 31	14 21	15 14				
	17	75 40.5	29.9	329 43.4	16.2	7 45.3	13.7	54.8	N 10	04 48	05 15	05 38	12 48	13 33	14 19	15 07				
	18	90 40.4	N21 30.3	344 18.6	16.3	N 7 31.6	13.7	54.8	0	05 06	05 32	05 54	12 55	13 35	14 17	15 00				
	19	105 40.3	30.7	358 53.9	16.3	7 17.9	13.8	54.8	S 10	05 21	05 47	06 10	13 01	13 38	14 15	14 53				
	20	120 40.2	31.1	13 29.2	16.3	7 04.1	13.8	54.9	20	05 36	06 03	06 27	13 08	13 40	14 12	14 46				
	21	135 40.1	31.5	28 04.5	16.3	6 50.3	13.8	54.9	30	05 51	06 20	06 46	13 15	13 42	14 10	14 38				
	22	150 40.1	31.9	42 39.8	16.3	6 36.5	13.9	54.9	35	05 58	06 30	06 57	13 20	13 44	14 08	14 34				
	23	165 40.0	32.3	57 15.1	16.3	6 22.6	13.9	54.9	40	06 07	06 40	07 10	13 25	13 46	14 06	14 29				
	MONDAY	29 00	180 39.9	N21 32.7	71 50.4	16.4	N 6 08.7	13.9	54.9	45	06 16	06 52	07 25	13 30	13 48	14 05	14 23			
01		195 39.8	33.1	86 25.8	16.3	5 54.8	14.0	55.0	S 50	06 26	07 06	07 44	13 37	13 50	14 02	14 16				
02		210 39.7	33.5	101 01.1	16.3	5 40.8	14.0	55.0	52	06 30	07 13	07 52	13 40	13 51	14 01	14 13				
03		225 39.7	33.9	115 36.4	16.3	5 26.8	14.1	55.0	54	06 35	07 20	08 02	13 44	13 52	14 00	14 09				
04		240 39.6	34.2	130 11.7	16.3	5 12.7	14.0	55.0	56	06 40	07 28	08 13	13 48	13 53	13 59	14 05				
05		255 39.5	34.6	144 47.0	16.3	4 58.7	14.1	55.0	58	06 46	07 37	08 26	13 52	13 55	13 58	14 01				
06		270 39.4	N21 35.0	159 22.3	16.3	N 4 44.6	14.1	55.1	S 60	06 52	07 47	08 41	13 57	13 56	13 56	13 56				
07		285 39.3	35.4	173 57.6	16.3	4 30.5	14.2	55.1	Lat.		Sunset		Twilight		Moonset					
08		300 39.3	35.8	188 32.9	16.3	4 16.3	14.2	55.1	Civil		Naut.		28		29		30		31	
09		315 39.2	36.2	203 08.2	16.3	4 02.1	14.2	55.1	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	
10		330 39.1	36.6	217 43.5	16.3	3 47.9	14.2	55.2	N 72	□	□	□	03 01	02 25	01 54	01 21				
11		345 39.0	37.0	232 18.8	16.2	3 33.7	14.3	55.2	N 70	□	□	□	02 44	02 18	01 54	01 29				
12		0 38.9	N21 37.4	246 54.0	16.3	N 3 19.4	14.3	55.2	68	□	□	□	02 31	02 12	01 54	01 36				
13		15 38.8	37.7	261 29.3	16.2	3 05.1	14.3	55.2	66	22 32	////	////	02 20	02 06	01 54	01 42				
14		30 38.8	38.1	276 04.5	16.2	2 50.8	14.4	55.3	64	21 51	////	////	02 10	02 02	01 54	01 46				
15		45 38.7	38.5	290 39.7	16.3	2 36.4	14.3	55.3	62	21 23	23 22	////	02 02	01 58	01 54	01 51				
16		60 38.6	38.9	305 15.0	16.1	2 22.1	14.4	55.3	60	21 02	22 22	////	01 55	01 55	01 54	01 54				
17		75 38.5	39.3	319 50.1	16.2	2 07.7	14.4	55.3	N 58	20 44	21 50	////	01 49	01 52	01 54	01 57				
18		90 38.4	N21 39.7	334 25.3	16.2	N 1 53.3	14.4	55.3	56	20 30	21 26	23 25	01 43	01 49	01 55	02 00				
19		105 38.3	40.0	349 00.5	16.1	1 38.9	14.5	55.4	54	20 17	21 08	22 30	01 38	01 47	01 55	02 03				
20		120 38.3	40.4	3 35.6	16.1	1 24.4	14.5	55.4	52	20 07	20 52	22 00	01 34	01 44	01 55	02 05				
21		135 38.2	40.8	18 10.7	16.1	1 09.9	14.4	55.4	50	19 57	20 39	21 39	01 29	01 42	01 55	02 07				
22		150 38.1	41.2	32 45.8	16.1	0 55.5	14.6	55.5	45	19 37	20 13	21 00	01 20	01 38	01 55	02 12				
23		165 38.0	41.6	47 20.9	16.0	0 40.9	14.5	55.5	N 40	19 20	19 52	20 32	01 13	01 34	01 55	02 16				
TUESDAY		30 00	180 37.9	N21 41.9	61 55.9	16.0	N 0 26.4	14.5	55.5	35	19 07	19 36	20 11	01 06	01 31	01 55	02 20			
	01	195 37.8	42.3	76 30.9	16.0	S 0 11.9	14.6	55.5	30	18 55	19 22	19 54	01 01	01 28	01 55	02 23				
	02	210 37.8	42.7	91 05.9	16.0	S 0 02.7	14.5	55.6	20	18 35	18 59	19 27	00 51	01 23	01 55	02 28				
	03	225 37.7	43.1	105 40.9	15.9	0 17.2	14.6	55.6	N 10	18 17	18 40	19 07	00 42	01 19	01 55	02 33				
	04	240 37.6	43.5	120 15.8	15.9	0 31.8	14.6	55.6	0	18 01	18 23	18 49	00 33	01 14	01 55	02 37				
	05	255 37.5	43.8	134 50.7	15.9	0 46.4	14.6	55.6	S 10	17 45	18 08	18 34	00 25	01 10	01 55	02 41				
	06	270 37.4	N21 44.2	149 25.6	15.8	S 1 01.0	14.6	55.7	20	17 28	17 52	18 19	00 16	01 05	01 55	02 46				
	07	285 37.3	44.6	164 00.4	15.8	1 15.6	14.7	55.7	30	17 09	17 35	18 04	00 06	01 00	01 55	02 52				
	08	300 37.2	45.0	178 35.2	15.8	1 30.3	14.6	55.7	35	16 57	17 25	17 56	00 00	00 57	01 55	02 55				
	09	315 37.2	45.3	193 10.0	15.7	1 44.9	14.7	55.8	40	16 45	17 14	17 48	24 54	00 54	01 55	02 58				
	10	330 37.1	45.7	207 44.7	15.7	1 59.6	14.6	55.8	45	16 29	17 02	17 39	24 49	00 49	01 55	03 02				
	11	345 37.0	46.1	222 19.4	15.7	2 14.2	14.7	55.8	S 50	16 11	16 48	17 29	24 45	00 45	01 55	03 07				
	12	0 36.9	N21 46.4	236 54.1	15.6	S 2 28.9	14.6	55.8	52	16 02	16 41	17 24	24 42	00 42	01 55	03 10				
	13	15 36.8	46.8	251 28.7	15.5	2 43.5	14.7	55.9	54	15 52	16 34	17 19	24 40	00 40	01 55	03 12				
	14	30 36.7	47.2	266 03.2	15.6	2 58.2	14.7	55.9	56	15 41	16 26	17 14	24 37	00 37	01 55	03 15				
	15	45 36.6	47.6	280 37.8	15.4	3 12.9	14.7	55.9	58	15 28	16 17	17 08	24 34	00 34	01 55	03 18				
	16	60 36.6	47.9	295 12.2	15.5	3 27.6	14.7	56.0	S 60	15 13	16 07	17 02	24 31	00 31	01 55	03 21				
	17	75 36.5	48.3	309 46.7	15.3	3 42.3	14.7	56.0	SUN		MOON									
	18	90 36.4	N21 48.7	324 21.0	15.4	S 3 57.0	14.7	56.0	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase				
	19	105 36.3	49.0	338 55.4	15.3	4 11.7	14.6	56.0		00 ^h	12 ^h	Pass.	Upper	Lower	d	% 				
	20	120 36.2	49.4	353 29.7	15.2	4 26.3	14.7	56.1												
	21	135 36.1	49.8	8 03.9	15.2	4 41.0	14.7													

UT	ARIES		VENUS −4.4		MARS +1.6		JUPITER −2.1		SATURN +0.8		STARS		
	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	Name	SHA ° / ' / "	Dec ° / ' / "
WEDNESDAY	31 00	248 14.2	131 12.5 N23 50.8	119 31.3 N20 13.1	216 53.8 N11 33.2	268 59.3 S10 22.0	Acomar	315 13.2 S40 12.6					
	01	263 16.6	146 12.3 50.3	134 32.3 12.7	231 55.8 33.4	284 01.7 22.0	Achernar	335 21.6 S57 06.9					
	02	278 19.1	161 12.2 49.8	149 33.3 12.4	246 57.7 33.6	299 04.1 21.9	Acrux	173 01.3 S63 14.0					
	03	293 21.5	176 12.0 49.3	164 34.2 12.0	261 59.7 33.8	314 06.5 21.9	Adhara	255 07.3 S29 00.3					
	04	308 24.0	191 11.8 48.8	179 35.2 11.6	277 01.6 34.0	329 08.9 21.9	Aldebaran	290 41.5 N16 33.3					
	05	323 26.5	206 11.6 48.3	194 36.2 11.2	292 03.6 34.1	344 11.3 21.9							
	06	338 28.9	221 11.4 N23 47.7	209 37.2 N20 10.8	307 05.5 N11 34.3	359 13.6 S10 21.9	Alioth	166 13.8 N55 50.2					
	07	353 31.4	236 11.3 47.2	224 38.1 10.4	322 07.5 34.5	14 16.0 21.9	Alkaid	152 52.7 N49 12.0					
	08	8 33.9	251 11.1 46.7	239 39.1 10.0	337 09.4 34.7	29 18.4 21.8	Alnair	27 34.5 S46 50.7					
	09	23 36.3	266 10.9 46.2	254 40.1 09.7	352 11.3 34.9	44 20.8 21.8	Alnilam	275 39.4 S 1 11.3					
	10	38 38.8	281 10.8 45.7	269 41.1 09.3	7 13.3 35.0	59 23.2 21.8	Alphard	217 49.2 S 8 45.6					
	11	53 41.3	296 10.6 45.2	284 42.1 08.9	22 15.2 35.2	74 25.6 21.8							
	12	68 43.7	311 10.4 N23 44.7	299 43.0 N20 08.5	37 17.2 N11 35.4	89 28.0 S10 21.8	Alphecca	126 04.5 N26 38.2					
	13	83 46.2	326 10.2 44.2	314 44.0 08.1	52 19.1 35.6	104 30.4 21.7	Alpheratz	357 36.3 N29 12.9					
	14	98 48.7	341 10.1 43.6	329 45.0 07.7	67 21.1 35.8	119 32.8 21.7	Altair	62 01.0 N 8 55.7					
	15	113 51.1	356 09.9 43.1	344 46.0 07.4	82 23.0 35.9	134 35.2 21.7	Ankaa	353 08.7 S42 10.6					
	16	128 53.6	11 09.7 42.6	359 46.9 07.0	97 25.0 36.1	149 37.6 21.7	Antares	112 17.1 S26 29.1					
	17	143 56.0	26 09.6 42.1	14 47.9 06.6	112 26.9 36.3	164 40.0 21.7							
	18	158 58.5	41 09.4 N23 41.6	29 48.9 N20 06.2	127 28.9 N11 36.5	179 42.4 S10 21.7	Arcturus	145 48.9 N19 03.7					
	19	174 01.0	56 09.2 41.0	44 49.9 05.8	142 30.8 36.7	194 44.8 21.6	Atria	107 12.0 S69 04.1					
	20	189 03.4	71 09.1 40.5	59 50.8 05.4	157 32.8 36.8	209 47.2 21.6	Avior	234 15.7 S59 35.2					
	21	204 05.9	86 08.9 40.0	74 51.8 05.0	172 34.7 37.0	224 49.6 21.6	Bellatrix	278 24.7 N 6 22.2					
	22	219 08.4	101 08.8 39.5	89 52.8 04.7	187 36.6 37.2	239 52.0 21.6	Betelgeuse	270 53.9 N 7 24.7					
	23	234 10.8	116 08.6 39.0	104 53.8 04.3	202 38.6 37.4	254 54.4 21.6							
THURSDAY	1 00	249 13.3	131 08.5 N23 38.4	119 54.8 N20 03.9	217 40.5 N11 37.6	269 56.8 S10 21.6	Canopus	263 53.5 S52 42.6					
	01	264 15.8	146 08.3 37.9	134 55.7 03.5	232 42.5 37.7	284 59.2 21.5	Capella	280 24.4 N46 01.3					
	02	279 18.2	161 08.1 37.4	149 56.7 03.1	247 44.4 37.9	300 01.5 21.5	Deneb	49 26.5 N45 21.5					
	03	294 20.7	176 08.0 36.9	164 57.7 02.7	262 46.4 38.1	315 03.9 21.5	Denebola	182 26.2 N14 26.6					
	04	309 23.1	191 07.8 36.3	179 58.7 02.3	277 48.3 38.3	330 06.3 21.5	Diphda	348 48.8 S17 51.5					
	05	324 25.6	206 07.7 35.8	194 59.6 01.9	292 50.3 38.5	345 08.7 21.5							
	06	339 28.1	221 07.5 N23 35.3	210 00.6 N20 01.5	307 52.2 N11 38.6	0 11.1 S10 21.5	Dubhe	193 42.6 N61 37.8					
	07	354 30.5	236 07.4 34.7	225 01.6 01.2	322 54.2 38.8	15 13.5 21.4	El Nath	278 04.0 N28 37.6					
	08	9 33.0	251 07.2 34.2	240 02.6 00.8	337 56.1 39.0	30 15.9 21.4	Eltanin	90 42.3 N51 29.0					
	09	24 35.5	266 07.1 33.7	255 03.6 00.4	352 58.1 39.2	45 18.3 21.4	Enif	33 40.0 N 9 58.8					
	10	39 37.9	281 07.0 33.1	270 04.5 20 00.0	8 00.0 39.3	60 20.7 21.4	Fomalhaut	15 16.0 S29 29.8					
	11	54 40.4	296 06.8 32.6	285 05.5 19 59.6	23 02.0 39.5	75 23.1 21.4							
	12	69 42.9	311 06.7 N23 32.1	300 06.5 N19 59.2	38 03.9 N11 39.7	90 25.5 S10 21.4	Gacrux	171 52.9 S57 14.9					
	13	84 45.3	326 06.5 31.5	315 07.5 58.8	53 05.9 39.9	105 27.9 21.3	Gienah	175 44.9 S17 40.4					
	14	99 47.8	341 06.4 31.0	330 08.4 58.4	68 07.8 40.1	120 30.3 21.3	Hadar	148 37.4 S60 29.3					
	15	114 50.3	356 06.2 30.5	345 09.4 58.0	83 09.7 40.2	135 32.7 21.3	Hamal	327 53.0 N23 34.2					
	16	129 52.7	11 06.1 29.9	0 10.4 57.6	98 11.7 40.4	150 35.1 21.3	Kaus Aust.	83 33.9 S34 22.4					
	17	144 55.2	26 06.0 29.4	15 11.4 57.3	113 13.6 40.6	165 37.5 21.3							
	18	159 57.6	41 05.8 N23 28.9	30 12.4 N19 56.9	128 15.6 N11 40.8	180 39.9 S10 21.3	Kochab	137 18.7 N74 03.7					
	19	175 00.1	56 05.7 28.3	45 13.3 56.5	143 17.5 41.0	195 42.3 21.2	Markab	13 31.3 N15 19.7					
	20	190 02.6	71 05.6 27.8	60 14.3 56.1	158 19.5 41.1	210 44.7 21.2	Menkar	314 07.9 N 4 10.8					
	21	205 05.0	86 05.4 27.2	75 15.3 55.7	173 21.4 41.3	225 47.1 21.2	Menkent	147 58.9 S36 29.2					
	22	220 07.5	101 05.3 26.7	90 16.3 55.3	188 23.4 41.5	240 49.5 21.2	Miaplacidus	221 39.0 S69 49.0					
	23	235 10.0	116 05.2 26.2	105 17.2 54.9	203 25.3 41.7	255 51.9 21.2							
FRIDAY	2 00	250 12.4	131 05.0 N23 25.6	120 18.2 N19 54.5	218 27.3 N11 41.8	270 54.3 S10 21.2	Mirfak	308 30.7 N49 56.5					
	01	265 14.9	146 04.9 25.1	135 19.2 54.1	233 29.2 42.0	285 56.7 21.2	Nunki	75 49.1 S26 16.0					
	02	280 17.4	161 04.8 24.5	150 20.2 53.7	248 31.2 42.2	300 59.1 21.1	Peacock	53 07.5 S56 39.4					
	03	295 19.8	176 04.7 24.0	165 21.2 53.3	263 33.1 42.4	316 01.5 21.1	Pollux	243 19.2 N27 58.3					
	04	310 22.3	191 04.5 23.4	180 22.1 52.9	278 35.1 42.6	331 03.9 21.1	Procyon	244 52.5 N 5 09.9					
	05	325 24.8	206 04.4 22.9	195 23.1 52.5	293 37.0 42.7	346 06.3 21.1							
	06	340 27.2	221 04.3 N23 22.3	210 24.1 N19 52.2	308 39.0 N11 42.9	1 08.7 S10 21.1	Rasalhague	95 59.5 N12 32.5					
	07	355 29.7	236 04.2 21.8	225 25.1 51.8	323 40.9 43.1	16 11.1 21.1	Regulus	207 35.9 N11 51.3					
	08	10 32.1	251 04.0 21.2	240 26.0 51.4	338 42.9 43.3	31 13.5 21.0	Rigel	281 05.5 S 8 10.5					
	09	25 34.6	266 03.9 20.7	255 27.0 51.0	353 44.8 43.4	46 15.9 21.0	Rigel Kent.	139 41.6 S60 56.0					
	10	40 37.1	281 03.8 20.1	270 28.0 50.6	8 46.8 43.6	61 18.3 21.0	Sabik	102 04.0 S15 45.3					
	11	55 39.5	296 03.7 19.6	285 29.0 50.2	23 48.7 43.8	76 20.7 21.0							
	12	70 42.0	311 03.6 N23 19.0	300 30.0 N19 49.8	38 50.7 N11 44.0	91 23.1 S10 21.0	Schedar	349 32.9 N56 39.6					
	13	85 44.5	326 03.5 18.5	315 30.9 49.4	53 52.6 44.2	106 25.5 21.0	Shaula	96 11.8 S37 07.2					
	14	100 46.9	341 03.4 17.9	330 31.9 49.0	68 54.6 44.3	121 27.9 21.0	Sirius	258 27.7 S16 44.9					
	15	115 49.4	356 03.2 17.4	345 32.9 48.6	83 56.5 44.5	136 30.3 20.9	Spica	158 23.5 S11 17.0					
	16	130 51.9	11 03.1 16.8	0 33.9 48.2	98 58.5 44.7	151 32.7 20.9	Suhail	222 47.5 S43 31.8					
	17	145 54.3	26 03.0 16.3	15 34.9 47.8	114 00.4 44.9	166 35.1 20.9							
	18	160 56.8	41 02.9 N23 15.7	30 35.8 N19 47.4	129 02.4 N11 45.0	181 37.5 S10 20.9	Vega	80 33.8 N38 48.1					
	19	175 59.2	56 02.8 15.2	45 36.8 47.0	144 04.3 45.2	196 39.9 20.9	Zuben'ubi	136 57.2 S16 08.4					
	20	191 01.7	71 02.7 14.6	60 37.8 46.6	159 06.3 45.4	211 42.3 20.9							
	21	206 04.2	86 02.6 14.0	75 38.8 46.2	174 08.2 45.6	226 44.7 20.9							
	22	221 06.6	101 02.5 13.5	90 39.7 45.8	189 10.2 45.7	241 47.1 20.8							
	23	236 09.1	116 02.4 12.9	105 40.7 45.4	204 12.1 45.9	256 49.5 20.8							
h m Mer.Pass. 7 21.9											SHA Mer.Pass. Venus 241 55.2 15 16 Mars 230 41.5 15 59 Jupiter 328 27.2 9 28 Saturn 20 43.5 5 59		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec		GHA		v	Dec		d	HP		31	1	2	3					
WEDNESDAY	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m		
	31 00	180	35.8	N21	50.8	51	46.3	15.0	S	5	25.1	14.6	56.2	N 72	17 10	20 01					
	01	195	35.8		51.2	66	20.3	14.9		5	39.7	14.7	56.2	N 70	16 54	19 17					
	02	210	35.7		51.6	80	54.2	14.9		5	54.4	14.7	56.3	68	16 41	18 48	21 44				
	03	225	35.6	..	51.9	95	28.1	14.9		6	09.1	14.6	56.3	66	16 31	18 26	20 45				
	04	240	35.5		52.3	110	02.0	14.7		6	23.7	14.7	56.3	64	16 22	18 09	20 11	22 44			
	05	255	35.4		52.6	124	35.7	14.8		6	38.4	14.6	56.3	62	16 15	17 56	19 46	21 49			
	06	270	35.3	N21	53.0	139	09.5	14.6	S	6	53.0	14.6	56.4	60	16 09	17 44	19 27	21 17			
	07	285	35.2		53.4	153	43.1	14.6		7	07.6	14.6	56.4	N 58	16 03	17 34	19 11	20 53			
	08	300	35.1		53.7	168	16.7	14.5		7	22.2	14.6	56.4	56	16 03	17 25	18 58	20 34			
	09	315	35.0	..	54.1	182	50.2	14.5		7	36.8	14.6	56.5	54	15 54	17 18	18 46	20 18			
	10	330	35.0		54.4	197	23.7	14.3		7	51.4	14.6	56.5	52	15 50	17 11	18 36	20 04			
	11	345	34.9		54.8	211	57.0	14.3		8	06.0	14.5	56.5	50	15 46	17 04	18 27	19 52			
	12	0	34.8	N21	55.1	226	30.3	14.3	S	8	20.5	14.6	56.6	45	15 39	16 51	18 08	19 27			
	13	15	34.7		55.5	241	03.6	14.1		8	35.1	14.5	56.6	N 40	15 32	16 40	17 52	19 07			
	14	30	34.6		55.9	255	36.7	14.1		8	49.6	14.5	56.6	35	15 27	16 31	17 39	18 51			
	15	45	34.5	..	56.2	270	09.8	14.0		8	49.6	14.5	56.6	30	15 22	16 23	17 28	18 37			
	16	60	34.4		56.6	284	42.8	14.0		9	18.5	14.5	56.7	20	15 14	16 09	17 09	18 13			
	17	75	34.3		56.9	299	15.8	13.8		9	33.0	14.4	56.7	N 10	15 07	15 57	16 52	17 52			
	18	90	34.2	N21	57.3	313	48.6	13.8	S	9	47.4	14.4	56.8	0	15 00	15 46	16 37	17 33			
	19	105	34.1		57.6	328	21.4	13.7		10	01.8	14.4	56.8	S 10	14 53	15 35	16 22	17 14			
	20	120	34.0		58.0	342	54.1	13.6		10	16.2	14.3	56.8	20	14 46	15 23	16 05	16 54			
	21	135	33.9	..	58.3	357	26.7	13.6		10	30.5	14.3	56.9	30	14 38	15 10	15 47	16 30			
	22	150	33.9		58.7	11	59.3	13.4		10	44.8	14.3	56.9	35	14 34	15 02	15 36	16 17			
	23	165	33.8		59.0	26	31.7	13.4		10	59.1	14.3	56.9	40	14 29	14 54	15 24	16 01			
THURSDAY	1 00	180	33.7	N21	59.4	41	04.1	13.3	S11	13.4	14.2	57.0	S 50	14 16	14 32	14 52	15 20				
	01	195	33.6	21	59.7	55	36.4	13.1		11	27.6	14.2	57.0	52	14 13	14 26	14 44	15 09			
	02	210	33.5	22	00.0	70	08.5	13.1		11	41.8	14.1	57.0	54	14 09	14 20	14 35	14 57			
	03	225	33.4	..	00.4	84	40.6	13.0		11	55.9	14.1	57.1	56	14 05	14 13	14 25	14 42			
	04	240	33.3		00.7	99	12.6	13.0		12	10.0	14.1	57.1	58	14 01	14 06	14 13	14 26			
	05	255	33.2		01.1	113	44.6	12.8		12	24.1	14.0	57.1	S 60	13 56	13 57	14 00	14 06			
	06	270	33.1	N22	01.4	128	16.4	12.7	S12	38.1	14.0	57.2									
	07	285	33.0		01.8	142	48.1	12.6		12	52.1	14.0	57.2	Lat.	Sunset	Twilight		Moonset			
	08	300	32.9		02.1	157	19.7	12.6		13	06.1	13.9	57.2			Civil	Naut.	31	1	2	3
	09	315	32.8	..	02.4	171	51.3	12.4		13	20.0	13.9	57.3								
	10	330	32.7		02.8	186	22.7	12.3		13	33.9	13.8	57.3								
	11	345	32.6		03.1	200	54.0	12.3		13	47.7	13.7	57.3	N 72	01 21	(⁹⁰ ₂₃ ⁴³ ₃₈)					
	12	0	32.5	N22	03.5	215	25.3	12.1	S14	01.4	13.7	57.4	N 70	01 29	01 00	00 16					
	13	15	32.5		03.8	229	56.4	12.1		14	15.1	13.7	57.4	68	01 36	01 15	(⁹⁰ ₂₃ ⁴³ ₃₈)				
	14	30	32.4		04.1	244	27.5	11.9		14	28.8	13.6	57.4	66	01 42	01 28	01 09	00 39			
	15	45	32.3	..	04.5	258	58.4	11.8		14	42.4	13.6	57.5	64	01 46	01 38	01 28	01 13			
	16	60	32.2		04.8	273	29.2	11.7		14	56.0	13.5	57.5	62	01 51	01 47	01 43	01 39			
	17	75	32.1		05.2	287	59.9	11.7		15	09.5	13.4	57.5	60	01 54	01 54	01 55	01 59			
	18	90	32.0	N22	05.5	302	30.6	11.5	S15	22.9	13.4	57.6	N 58	01 57	02 01	02 06	02 15				
	19	105	31.9		05.8	317	01.1	11.4		15	36.3	13.3	57.6	56	02 00	02 07	02 16	02 30			
	20	120	31.8		06.2	331	31.5	11.2		15	49.6	13.3	57.6	54	02 03	02 12	02 25	02 42			
	21	135	31.7	..	06.5	346	01.7	11.2		16	02.9	13.2	57.7	52	02 05	02 17	02 32	02 53			
	22	150	31.6		06.8	0	31.9	11.1		16	16.1	13.1	57.7	50	02 07	02 22	02 39	03 02			
	23	165	31.5		07.2	15	02.0	10.9		16	29.2	13.0	57.7	45	02 12	02 31	02 54	03 23			
	FRIDAY	2 00	180	31.4	N22	07.5	29	31.9	10.9	S16	42.2	13.0	57.8	N 40	02 16	02 39	03 06	03 40			
01		195	31.3		07.8	44	01.8	10.7		16	55.2	13.0	57.8	35	02 20	02 46	03 17	03 54			
02		210	31.2		08.1	58	31.5	10.6		17	08.2	12.8	57.8	30	02 23	02 52	03 26	04 06			
03		225	31.1	..	08.5	73	01.1	10.5		17	21.0	12.8	57.9	20	02 28	03 03	03 42	04 27			
04		240	31.0		08.8	87	30.6	10.4		17	33.8	12.7	57.9	N 10	02 33	03 13	03 56	04 46			
05		255	30.9		09.1	102	00.0	10.3		17	46.5	12.6	57.9	0	02 37	03 21	04 10	05 03			
06		270	30.8	N22	09.5	116	29.3	10.1	S17	59.1	12.5	58.0	S 10	02 41	03 30	04 23	05 20				
07		285	30.7		09.8	130	58.4	10.0		18	11.6	12.5	58.0	20	02 46	03 40	04 37	05 39			
08		300	30.6		10.1	145	27.4	9.9		18	24.1	12.3	58.0	30	02 52	03 51	04 54	06 00			
09		315	30.5	..	10.4	159	56.3	9.8		18	36.4	12.3	58.1	35	02 55	03 57	05 03	06 13			
10		330	30.4		10.8	174	25.1	9.7		18	48.7	12.2	58.1	40	02 58	04 04	05 14	06 28			
11		345	30.3		11.1	188	53.8	9.5		19	00.9	12.1	58.1	45	03 02	04 13	05 27	06 45			
12		0	30.2	N22	11.4	203	22.3	9.4	S19	13.0	12.1	58.2	S 50	03 07	04 23	05 43	07 07				
13		15	30.1		11.7	217	50.7	9.3		19	25.1	11.9	58.2	52	03 10	04 28	05 51	07 17			
14		30	30.0		12.0	232	19.0	9.2		19	37.0	11.8	58.2	54	03 12	04 33	05 59	07 29			
15		45	29.9	..	12.4	246	47.2	9.0		19	48.8	11.7	58.3	56	03 15	04 39	06 08	07 43			
16		60	29.8		12.7	261	15.2	9.0		20	00.5	11.7	58.3	58	03 18	04 46	06 19	07 59			
17		75	29.7		13.0	275	43.2	8.8		20	12.2	11.5	58.3	S 60	03 21	04 53	06 32	08 18			
18		90	29.6	N22	13.3	290	11.0	8.6	S20	23.7	11.5	58.3		SUN			MOON				
19		105	29.5		13.6	304	38.6	8.6		20	35.2	11.3	58.4	Day	Eqn. of Time	Mer.	Mer. Pass.	Age	Phase		
20		120	29.4		14.0	319	06.2	8.4		20	46.5	11.2	58.4		00 ^h	12 ^h	Pass.	Upper	Lower	d	%
21		135	29.3	..	14.3	333	33.6	8.3		20	57.7	11.1	58.4		02 24	02 19	11 58	21 11	08 48	12 85	
22		150	29.2		14.6	348	00.9	8.2		21	08.8	11.0	58.5		02 15	02 10	11 58	21 58	09 34	13 91	
23		165	29.1		14.9	2	28.1	8.0	S21	19.8	10.9	58.5		02 06	02 01	11 58	22 50	10 23	14 97		
		SD	15.8	d	0.3	SD	15.4	15.6	15.8												

UT	ARIES	VENUS	-4.4	MARS	+1.6	JUPITER	-2.1	SATURN	+0.8	STARS				
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec		
3 00	251 11.6	131 02.3	N23 12.4	120 41.7	N19 45.0	219 14.1	N11 46.1	271 52.0	S10 20.8	Acamar	315 13.2	S40 12.6		
01	266 14.0	146 02.2	11.8	135 42.7	44.6	234 16.0	46.3	286 54.4	20.8	Achernar	335 21.6	S57 06.9		
02	281 16.5	161 02.1	11.2	150 43.7	44.2	249 18.0	46.5	301 56.8	20.8	Acruz	173 01.3	S63 14.0		
03	296 19.0	176 02.0	10.7	165 44.6	43.8	264 19.9	46.6	316 59.2	20.8	Adhara	255 07.3	S29 00.3		
04	311 21.4	191 01.9	10.1	180 45.6	43.4	279 21.9	46.8	332 01.6	20.8	Aldebaran	290 41.5	N16 33.3		
05	326 23.9	206 01.8	09.5	195 46.6	43.0	294 23.8	47.0	347 04.0	20.7					
SATURDAY	06	341 26.4	221 01.7	N23 09.0	210 47.6	N19 42.6	309 25.8	N11 47.2	2 06.4	S10 20.7	Alioth	166 13.9	N55 50.2	
	07	356 28.8	236 01.6	08.4	225 48.6	42.2	324 27.7	47.3	17 08.8	20.7	Alkaid	152 52.7	N49 12.0	
	08	11 31.3	251 01.5	07.8	240 49.5	41.8	339 29.7	47.5	32 11.2	20.7	Alnair	27 34.5	S46 50.1	
	09	26 33.7	266 01.4	07.3	255 50.5	41.4	354 31.6	47.7	47 13.6	20.7	Alnilam	275 39.4	S 1 11.1	
	10	41 36.2	281 01.4	06.7	270 51.5	41.0	9 33.6	47.9	62 16.0	20.7	Alphard	217 49.2	S 8 45.6	
	11	56 38.7	296 01.3	06.1	285 52.5	40.6	24 35.5	48.0	77 18.4	20.7				
	12	71 41.1	311 01.2	N23 05.6	300 53.5	N19 40.2	39 37.5	N11 48.2	92 20.8	S10 20.7	Alphecca	126 04.5	N26 38.2	
	13	86 43.6	326 01.1	05.0	315 54.4	39.8	54 39.5	48.4	107 23.2	20.6	Alpheratz	357 36.3	N29 12.9	
	14	101 46.1	341 01.0	04.4	330 55.4	39.4	69 41.4	48.6	122 25.6	20.6	Altair	62 01.0	N 8 55.7	
	15	116 48.5	356 00.9	03.8	345 56.4	39.0	84 43.4	48.7	137 28.0	20.6	Ankaa	353 08.6	S42 10.6	
	16	131 51.0	11 00.8	03.3	0 57.4	38.6	99 45.3	48.9	152 30.4	20.6	Antares	112 17.1	S26 29.1	
	17	146 53.5	26 00.8	02.7	15 58.4	38.2	114 47.3	49.1	167 32.8	20.6				
	18	161 55.9	41 00.7	N23 02.1	30 59.3	N19 37.8	129 49.2	N11 49.3	182 35.2	S10 20.6	Arcturus	145 48.9	N19 03.7	
	19	176 58.4	56 00.6	01.5	46 00.3	37.4	144 51.2	49.4	197 37.7	20.6	Atria	107 12.0	S69 04.1	
	20	192 00.9	71 00.5	01.0	61 01.3	37.0	159 53.1	49.6	212 40.1	20.6	Avior	234 15.7	S59 35.2	
	21	207 03.3	86 00.5	23 00.4	76 02.3	36.6	174 55.1	49.8	227 42.5	20.5	Bellatrix	278 24.7	N 6 22.2	
	22	222 05.8	101 00.4	22 59.8	91 03.3	36.2	189 57.0	50.0	242 44.9	20.5	Betelgeuse	270 53.9	N 7 24.7	
	23	237 08.2	116 00.3	59.2	106 04.2	35.8	204 59.0	50.1	257 47.3	20.5				
	SUNDAY	4 00	252 10.7	131 00.2	N22 58.7	121 05.2	N19 35.4	220 00.9	N11 50.3	272 49.7	S10 20.5	Canopus	263 53.5	S52 42.6
		01	267 13.2	146 00.2	58.1	136 06.2	35.0	235 02.9	50.5	287 52.1	20.5	Capella	280 24.4	N46 01.3
		02	282 15.6	161 00.1	57.5	151 07.2	34.6	250 04.8	50.7	302 54.5	20.5	Deneb	49 26.4	N45 21.5
		03	297 18.1	176 00.0	56.9	166 08.2	34.2	265 06.8	50.8	317 56.9	20.5	Denebola	182 26.3	N14 26.6
		04	312 20.6	191 00.0	56.3	181 09.1	33.8	280 08.7	51.0	332 59.3	20.5	Diphda	348 48.8	S17 51.5
05		327 23.0	205 59.9	55.8	196 10.1	33.4	295 10.7	51.2	348 01.7	20.4				
06		342 25.5	220 59.8	N22 55.2	211 11.1	N19 33.0	310 12.7	N11 51.4	3 04.1	S10 20.4	Dubhe	193 42.6	N61 37.8	
07		357 28.0	235 59.8	54.6	226 12.1	32.6	325 14.6	51.5	18 06.5	20.4	Elnath	278 04.0	N28 37.6	
08		12 30.4	250 59.7	54.0	241 13.1	32.2	340 16.6	51.7	33 09.0	20.4	Eltanin	90 42.3	N51 29.0	
09		27 32.9	265 59.7	53.4	256 14.0	31.8	355 18.5	51.9	48 11.4	20.4	Enif	33 40.0	N 9 58.8	
10		42 35.4	280 59.6	52.8	271 15.0	31.4	10 20.5	52.1	63 13.8	20.4	Fomalhaut	15 16.0	S29 29.8	
11		57 37.8	295 59.5	52.2	286 16.0	31.0	25 22.4	52.2	78 16.2	20.4				
12		72 40.3	310 59.5	N22 51.7	301 17.0	N19 30.6	40 24.4	N11 52.4	93 18.6	S10 20.4	Gacrux	171 52.9	S57 14.9	
13		87 42.7	325 59.4	51.1	316 18.0	30.2	55 26.3	52.6	108 21.0	20.3	Gienah	175 44.9	S17 40.4	
14		102 45.2	340 59.4	50.5	331 18.9	29.8	70 28.3	52.8	123 23.4	20.3	Hadar	148 37.4	S60 29.3	
15		117 47.7	355 59.3	49.9	346 19.9	29.4	85 30.2	52.9	138 25.8	20.3	Hamal	327 53.0	N23 34.2	
16		132 50.1	10 59.3	49.3	1 20.9	29.0	100 32.2	53.1	153 28.2	20.3	Kaus Aust.	83 33.9	S34 22.4	
17		147 52.6	25 59.2	48.7	16 21.9	28.6	115 34.2	53.3	168 30.6	20.3				
18		162 55.1	40 59.2	N22 48.1	31 22.9	N19 28.1	130 36.1	N11 53.5	183 33.0	S10 20.3	Kochab	137 18.7	N74 03.7	
19		177 57.5	55 59.1	47.5	46 23.8	27.7	145 38.1	53.6	198 35.5	20.3	Markab	13 31.2	N15 19.7	
20		193 00.0	70 59.1	46.9	61 24.8	27.3	160 40.0	53.8	213 37.9	20.3	Menkar	314 07.9	N 4 10.8	
21		208 02.5	85 59.0	46.3	76 25.8	26.9	175 42.0	54.0	228 40.3	20.3	Menkent	147 58.9	S36 29.2	
22		223 04.9	100 59.0	45.7	91 26.8	26.5	190 43.9	54.2	243 42.7	20.2	Miaplacidus	221 39.0	S69 49.0	
23	238 07.4	115 58.9	45.1	106 27.8	26.1	205 45.9	54.3	258 45.1	20.2					
MONDAY	5 00	253 09.9	130 58.9	N22 44.5	121 28.7	N19 25.7	220 47.8	N11 54.5	273 47.5	S10 20.2	Mirfak	308 30.7	N49 56.1	
	01	268 12.3	145 58.9	43.9	136 29.7	25.3	235 49.8	54.7	288 49.9	20.2	Nunki	75 49.1	S26 16.0	
	02	283 14.8	160 58.8	43.3	151 30.7	24.9	250 51.8	54.9	303 52.3	20.2	Peacock	53 07.5	S56 39.4	
	03	298 17.2	175 58.8	42.8	166 31.7	24.5	265 53.7	55.0	318 54.7	20.2	Pollux	243 19.2	N27 58.3	
	04	313 19.7	190 58.7	42.2	181 32.7	24.1	280 55.7	55.2	333 57.2	20.2	Procyon	244 52.5	N 5 09.9	
	05	328 22.2	205 58.7	41.6	196 33.6	23.7	295 57.6	55.4	348 59.6	20.2				
	06	343 24.6	220 58.7	N22 41.0	211 34.6	N19 23.3	310 59.6	N11 55.6	4 02.0	S10 20.2	Rasalhague	95 59.5	N12 32.5	
	07	358 27.1	235 58.6	40.4	226 35.6	22.8	326 01.5	55.7	19 04.4	20.1	Regulus	207 36.0	N11 51.3	
	08	13 29.6	250 58.6	39.7	241 36.6	22.4	341 03.5	55.9	34 06.8	20.1	Rigel	281 05.5	S 8 10.5	
	09	28 32.0	265 58.6	39.1	256 37.6	22.0	356 05.4	56.1	49 09.2	20.1	Rigel Kent.	139 41.6	S60 56.0	
	10	43 34.5	280 58.5	38.5	271 38.6	21.6	11 07.4	56.2	64 11.6	20.1	Sabik	102 04.0	S15 45.2	
	11	58 37.0	295 58.5	37.9	286 39.5	21.2	26 09.4	56.4	79 14.0	20.1				
	12	73 39.4	310 58.5	N22 37.3	301 40.5	N19 20.8	41 11.3	N11 56.6	94 16.5	S10 20.1	Schedar	349 32.8	N56 39.6	
	13	88 41.9	325 58.5	36.7	316 41.5	20.4	56 13.3	56.8	109 18.9	20.1	Shaula	96 11.8	S37 07.2	
	14	103 44.4	340 58.4	36.1	331 42.5	20.0	71 15.2	56.9	124 21.3	20.1	Sirius	258 27.7	S16 44.9	
	15	118 46.8	355 58.4	35.5	346 43.5	19.6	86 17.2	57.1	139 23.7	20.1	Spica	158 23.5	S11 17.0	
	16	133 49.3	10 58.4	34.9	1 44.4	19.2	101 19.1	57.3	154 26.1	20.1	Suhail	222 47.5	S43 31.8	
	17	148 51.7	25 58.4	34.3	16 45.4	18.7	116 21.1	57.5	169 28.5	20.0				
	18	163 54.2	40 58.4	N22 33.7	31 46.4	N19 18.3	131 23.1	N11 57.6	184 30.9	S10 20.0	Vega	80 33.7	N38 48.2	
	19	178 56.7	55 58.3	33.1	46 47.4	17.9	146 25.0	57.8	199 33.4	20.0	Zuben'ubi	136 57.2	S16 08.4	
	20	193 59.1	70 58.3	32.5	61 48.4	17.5	161 27.0	58.0	214 35.8	20.0		SHA	Mer. Pass.	
	21	209 01.6	85 58.3	31.9	76 49.4	17.1	176 28.9	58.2	229 38.2	20.0		h m		
	22	224 04.1	100 58.3	31.3	91 50.3	16.7	191 30.9	58.3	244 40.6	20.0	Venus	238 49.5	15 16	
23	239 06.5	115 58.3	30.6	106 51.3	16.3	206 32.8	58.5	259 43.0	20.0	Mars	228 54.5	15 55		
	h m									Jupiter	327 50.2	9 19		
Mer. Pass.	7 10.1	v -0.1	d 0.6	v 1.0	d 0.4	v 2.0	d 0.2	v 2.4	d 0.0	Saturn	20 39.0	5 48		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	3	4	5	6				
d h	° /	° /	° /	° /	° /	° /	° /	°	h m	h m	h m	h m	h m	h m	h m	h m					
SATURDAY	3 00	180	29.0	N22	15.2	16	55.1	8.0	S21	30.7	10.8	58.5	N 72								
	01	195	28.9		15.5	31	22.1	7.8	21	41.5	10.7	58.6	N 70								
	02	210	28.8		15.9	45	48.9	7.6	21	52.2	10.5	58.6	66	////	////	01 00					
	03	225	28.7		16.2	60	15.5	7.6	22	02.7	10.5	58.6	64	////	////	01 51					
	04	240	28.6		16.5	74	42.1	7.4	22	13.2	10.3	58.6	62	////	////	02 23	21 49	24 04	00 04	01 31	
	05	255	28.5		16.8	89	08.5	7.3	22	23.5	10.1	58.7	60	////	01 18	02 46	21 17	23 03	24 16	00 16	
	06	270	28.4	N22	17.1	103	34.8	7.1	S22	33.6	10.1	58.7	N 58	////	01 55	03 04	20 53	22 29	23 40	24 20	
	07	285	28.3		17.4	118	00.9	7.1	22	43.7	9.9	58.7	56	////	02 21	03 19	20 34	22 04	23 14	23 59	
	08	300	28.2		17.7	132	27.0	6.9	22	53.6	9.8	58.8	54	01 11	02 41	03 33	20 18	21 44	22 54	23 42	
	09	315	28.1		18.0	146	52.9	6.8	23	03.4	9.7	58.8	52	01 46	02 57	03 44	20 04	21 27	22 36	23 27	
	10	330	28.0		18.3	161	18.7	6.6	23	13.1	9.6	58.8	50	02 09	03 11	03 54	19 52	21 13	22 22	23 13	
	11	345	27.9		18.6	175	44.3	6.6	23	22.7	9.4	58.9	45	02 51	03 39	04 15	19 27	20 44	21 52	22 47	
	12	0	27.8	N22	19.0	190	09.9	6.4	S23	32.1	9.2	58.9	N 40	03 19	04 00	04 32	19 07	20 21	21 28	22 25	
	13	15	27.7		19.3	204	35.3	6.3	23	41.3	9.1	58.9	35	03 41	04 17	04 47	18 51	20 02	21 09	22 07	
	14	30	27.6		19.6	219	00.6	6.2	23	50.4	9.0	58.9	30	03 59	04 32	04 59	18 37	19 46	20 52	21 52	
	15	45	27.5		19.9	233	25.8	6.0	23	59.4	8.9	59.0	20	04 27	04 56	05 20	18 13	19 19	20 24	21 26	
	16	60	27.4		20.2	247	50.8	5.9	24	08.3	8.7	59.0	N 10	04 48	05 15	05 38	17 52	18 55	20 00	21 03	
	17	75	27.3		20.5	262	15.7	5.9	24	17.0	8.5	59.0	0	05 06	05 32	05 55	17 33	18 34	19 38	20 42	
	18	90	27.2	N22	20.8	276	40.6	5.7	S24	25.5	8.4	59.0	S 10	05 22	05 49	06 11	17 14	18 12	19 16	20 21	
	19	105	27.1		21.1	291	05.3	5.5	24	33.9	8.3	59.1	20	05 38	06 05	06 29	16 54	17 49	18 52	19 59	
	20	120	27.0		21.4	305	29.8	5.5	24	42.2	8.1	59.1	30	05 53	06 23	06 49	16 30	17 23	18 24	19 32	
	21	135	26.9		21.7	319	54.3	5.3	24	50.3	7.9	59.1	35	06 02	06 33	07 01	16 17	17 07	18 07	19 17	
	22	150	26.8		22.0	334	18.6	5.3	24	58.2	7.8	59.1	40	06 10	06 44	07 14	16 01	16 49	17 48	18 59	
	23	165	26.7		22.3	348	42.9	5.1	25	06.0	7.7	59.2	45	06 20	06 57	07 30	15 43	16 27	17 25	18 37	
	SUNDAY	4 00	180	26.6	N22	22.6	3	07.0	5.0	S25	13.7	7.4	59.2	S 50	06 31	07 12	07 50	15 20	15 59	16 55	18 09
01		195	26.5		22.9	17	31.0	4.9	25	21.1	7.4	59.2	52	06 36	07 19	07 59	15 09	15 46	16 41	17 55	
02		210	26.4		23.2	31	54.9	4.8	25	28.5	7.1	59.2	54	06 41	07 26	08 09	14 57	15 31	16 24	17 40	
03		225	26.3		23.5	46	18.7	4.7	25	35.6	7.0	59.3	56	06 47	07 35	08 21	14 42	15 12	16 04	17 21	
04		240	26.1		23.8	60	42.4	4.5	25	42.6	6.8	59.3	58	06 53	07 44	08 35	14 26	14 50	15 38	16 58	
05		255	26.0		24.1	75	05.9	4.5	25	49.4	6.7	59.3	S 60	07 00	07 55	08 51	14 06	14 22	15 04	16 28	
06		270	25.9	N22	24.4	89	29.4	4.4	S25	56.1	6.5	59.3	Lat.	Sunset	Twilight		Moonset				
07		285	25.8		24.7	103	52.8	4.2	26	02.6	6.3	59.4			Civil	Naut.	3	4	5	6	
08		300	25.7		24.9	118	16.0	4.2	26	08.9	6.1	59.4	°	h m	h m	h m	h m	h m	h m	h m	h m
09		315	25.6		25.2	132	39.2	4.1	26	15.0	6.0	59.4									
10		330	25.5		25.5	147	02.3	3.9	26	21.0	5.8	59.4	N 70								
11		345	25.4		25.8	161	25.2	3.9	26	26.8	5.6	59.4	68								
12		0	25.3	N22	26.1	175	48.1	3.8	S26	32.4	5.4	59.5	66	23 01	////	////	00 39				
13		15	25.2		26.4	190	10.9	3.7	26	37.8	5.3	59.5	64	22 07	////	////	01 13	00 39			
14		30	25.1		26.7	204	33.6	3.6	26	43.1	5.0	59.5	62	21 35	////	////	01 39	01 35	01 30	02 19	
15		45	25.0		27.0	218	56.2	3.5	26	48.1	4.9	59.5	60	21 12	22 41	////	01 59	02 08	02 31	03 34	
16		60	24.9		27.3	233	18.7	3.5	26	53.0	4.7	59.5	N 58	20 53	22 03	////	02 15	02 32	03 06	04 09	
17		75	24.8		27.6	247	41.2	3.4	26	57.7	4.5	59.6	56	20 38	21 37	////	02 30	02 52	03 31	04 35	
18		90	24.7	N22	27.8	262	03.6	3.2	S27	02.2	4.4	59.6	54	20 25	21 17	22 48	02 42	03 08	03 51	04 55	
19		105	24.6		28.1	276	25.8	3.3	27	06.6	4.1	59.6	52	20 13	21 00	22 13	02 53	03 23	04 08	05 13	
20		120	24.5		28.4	290	48.1	3.1	27	10.7	3.9	59.6	50	20 03	20 46	21 48	03 02	03 35	04 22	05 27	
21		135	24.3		28.7	305	10.2	3.1	27	14.6	3.8	59.6	45	19 42	20 18	21 07	03 23	04 01	04 52	05 57	
22		150	24.2		29.0	319	32.3	3.0	27	18.4	3.6	59.7	N 40	19 25	19 57	20 38	03 40	04 22	05 15	06 20	
23		165	24.1		29.3	333	54.3	2.9	27	22.0	3.3	59.7	35	19 10	19 40	20 16	03 54	04 39	05 34	06 39	
MONDAY		5 00	180	24.0	N22	29.5	348	16.2	2.9	S27	25.3	3.2	59.7	30	18 58	19 25	19 58	04 06	04 54	05 50	06 56
	01	195	23.9		29.8	2	38.1	2.8	27	28.5	3.0	59.7	20	18 37	19 01	19 30	04 27	05 19	06 18	07 23	
	02	210	23.8		30.1	16	59.9	2.8	27	31.5	2.8	59.7	N 10	18 19	18 42	19 09	04 46	05 41	06 42	07 47	
	03	225	23.7		30.4	31	21.7	2.7	27	34.3	2.6	59.7	0	18 02	18 24	18 50	05 03	06 01	07 04	08 09	
	04	240	23.6		30.7	45	43.4	2.6	27	36.9	2.4	59.8	S 10	17 45	18 08	18 34	05 20	06 22	07 26	08 31	
	05	255	23.5		30.9	60	05.0	2.6	27	39.3	2.2	59.8	20	17 28	17 51	18 19	05 39	06 44	07 50	08 54	
	06	270	23.4	N22	31.2	74	26.6	2.6	S27	41.5	2.0	59.8	30	17 07	17 34	18 03	06 00	07 10	08 18	09 21	
	07	285	23.3		31.5	88	48.2	2.5	27	43.5	1.8	59.8	35	16 56	17 24	17 55	06 13	07 25	08 34	09 37	
	08	300	23.2		31.8	103	09.7	2.5	27	45.3	1.6	59.8	40	16 42	17 12	17 46	06 28	07 42	08 54	09 56	
	09	315	23.0		32.1	117	31.2	2.4	27	46.9	1.4	59.8	45	16 26	17 00	17 36	06 45	08 04	09 17	10 18	
	10	330	22.9		32.3	131	52.6	2.4	27	48.3	1.1	59.8	S 50	16 07	16 45	17 26	07 07	08 31	09 46	10 47	
	11	345	22.8		32.6	146	14.0	2.4	27	49.4	1.0	59.9	52	15 57	16 38	17 21	07 17	08 44	10 01	11 01	
	12	0	22.7	N22	32.9	160	35.4	2.4	S27	50.4	0.8	59.9	54	15 47	16 30	17 15	07 29	08 59	10 18	11 17	
	13	15	22.6		33.2	174	56.8	2.3	27	51.2	0.6	59.9	56	15 35	16 21	17 10	07 43	09 17	10 38	11 36	
	14	30	22.5		33.4	189	18.1	2.3	27	51.8	0.4	59.9	58	15 22	16 12	17 04	07 59	09 38	11 03	11 59	
	15																				

UT	ARIES			VENUS −4.4			MARS +1.6			JUPITER −2.1			SATURN +0.8			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
TUESDAY	00	254 09.0	130 58.3 N22 30.0	121 52.3 N19 15.9	221 34.8 N11 58.7	274 45.4 S10 20.0	Acamar	315 13.2 S40 12.6										
	01	269 11.5	145 58.3 29.4	136 53.3 15.4	236 36.8 58.8	289 47.8 20.0	Achernar	335 21.6 S57 06.9										
	02	284 13.9	160 58.2 28.8	151 54.3 15.0	251 38.7 59.0	304 50.3 20.0	Acrux	173 01.3 S63 14.0										
	03	299 16.4	175 58.2 28.2	166 55.2 14.6	266 40.7 59.2	319 52.7 20.0	Adhara	255 07.3 S29 00.3										
	04	314 18.9	190 58.2 27.6	181 56.2 14.2	281 42.6 59.4	334 55.1 19.9	Aldebaran	290 41.5 N16 33.3										
	05	329 21.3	205 58.2 27.0	196 57.2 13.8	296 44.6 59.5	349 57.5 19.9												
	06	344 23.8	220 58.2 N22 26.3	211 58.2 N19 13.4	311 46.6 N11 59.7	4 59.9 S10 19.9	Alioth	166 13.9 N55 50.2										
	07	359 26.2	235 58.2 25.7	226 59.2 13.0	326 48.5 11 59.9	20 02.3 19.9	Alkaid	152 52.7 N49 12.0										
	08	14 28.7	250 58.2 25.1	242 00.2 12.6	341 50.5 12 00.0	35 04.8 19.9	Alnair	27 34.5 S46 50.7										
	09	29 31.2	265 58.2 24.5	257 01.1 12.1	356 52.4 00.2	50 07.2 19.9	Alnilam	275 39.4 S 1 11.2										
	10	44 33.6	280 58.2 23.9	272 02.1 11.7	11 54.4 00.4	65 09.6 19.9	Alphard	217 49.2 S 8 45.6										
	11	59 36.1	295 58.2 23.2	287 03.1 11.3	26 56.4 00.6	80 12.0 19.9												
	12	74 38.6	310 58.2 N22 22.6	302 04.1 N19 10.9	41 58.3 N12 00.7	95 14.4 S10 19.9	Alphecca	126 04.5 N26 38.2										
	13	89 41.0	325 58.2 22.0	317 05.1 10.5	57 00.3 00.9	110 16.8 19.9	Alpheratz	357 36.3 N29 12.9										
	14	104 43.5	340 58.2 21.4	332 06.0 10.1	72 02.2 01.1	125 19.3 19.9	Altair	62 01.0 N 8 55.7										
	15	119 46.0	355 58.2 20.8	347 07.0 09.7	87 04.2 01.2	140 21.7 19.8	Ankaa	353 08.6 S42 10.6										
	16	134 48.4	10 58.2 20.1	2 08.0 09.2	102 06.1 01.4	155 24.1 19.8	Antares	112 17.1 S26 29.1										
	17	149 50.9	25 58.3 19.5	17 09.0 08.8	117 08.1 01.6	170 26.5 19.8												
	18	164 53.4	40 58.3 N22 18.9	32 10.0 N19 08.4	132 10.1 N12 01.8	185 28.9 S10 19.8	Arcturus	145 48.9 N19 03.7										
	19	179 55.8	55 58.3 18.3	47 11.0 08.0	147 12.0 01.9	200 31.3 19.8	Atria	107 12.0 S69 04.2										
	20	194 58.3	70 58.3 17.6	62 11.9 07.6	162 14.0 02.1	215 33.8 19.8	Avior	234 15.7 S59 35.2										
	21	210 00.7	85 58.3 17.0	77 12.9 07.2	177 15.9 02.3	230 36.2 19.8	Bellatrix	278 24.6 N 6 22.2										
	22	225 03.2	100 58.3 16.4	92 13.9 06.7	192 17.9 02.4	245 38.6 19.8	Betelgeuse	270 53.9 N 7 24.7										
	23	240 05.7	115 58.3 15.8	107 14.9 06.3	207 19.9 02.6	260 41.0 19.8												
	WEDNESDAY	00	255 08.1	130 58.4 N22 15.1	122 15.9 N19 05.9	222 21.8 N12 02.8	275 43.4 S10 19.8	Canopus	263 53.5 S52 42.5									
01		270 10.6	145 58.4 14.5	137 16.9 05.5	237 23.8 03.0	290 45.9 19.8	Capella	280 24.3 N46 01.2										
02		285 13.1	160 58.4 13.9	152 17.8 05.1	252 25.8 03.1	305 48.3 19.8	Deneb	49 26.4 N45 21.6										
03		300 15.5	175 58.4 13.2	167 18.8 04.7	267 27.7 03.3	320 50.7 19.7	Denebola	182 26.3 N14 26.6										
04		315 18.0	190 58.5 12.6	182 19.8 04.2	282 29.7 03.5	335 53.1 19.7	Diphda	348 48.8 S17 51.5										
05		330 20.5	205 58.5 12.0	197 20.8 03.8	297 31.6 03.6	350 55.5 19.7												
06		345 22.9	220 58.5 N22 11.3	212 21.8 N19 03.4	312 33.6 N12 03.8	5 58.0 S10 19.7	Dubhe	193 42.7 N61 37.8										
07		0 25.4	235 58.5 10.7	227 22.8 03.0	327 35.6 04.0	21 00.4 19.7	Elath	278 03.9 N28 37.6										
08		15 27.9	250 58.6 10.1	242 23.7 02.6	342 37.5 04.2	36 02.8 19.7	Eltanin	90 42.3 N51 29.0										
09		30 30.3	265 58.6 09.4	257 24.7 02.1	357 39.5 04.3	51 05.2 19.7	Enif	33 40.0 N 9 58.8										
10		45 32.8	280 58.6 08.8	272 25.7 01.7	12 41.4 04.5	66 07.6 19.7	Fomalhaut	15 16.0 S29 29.8										
11		60 35.2	295 58.7 08.2	287 26.7 01.3	27 43.4 04.7	81 10.1 19.7												
12		75 37.7	310 58.7 N22 07.5	302 27.7 N19 00.9	42 45.4 N12 04.8	96 12.5 S10 19.7	Gacrux	171 52.9 S57 14.9										
13		90 40.2	325 58.7 06.9	317 28.7 00.5	57 47.3 05.0	111 14.9 19.7	Gienah	175 44.9 S17 40.4										
14		105 42.6	340 58.8 06.3	332 29.6 19 00.0	72 49.3 05.2	126 17.3 19.7	Hadar	148 37.4 S60 29.3										
15		120 45.1	355 58.8 05.6	347 30.6 18 59.6	87 51.3 05.4	141 19.7 19.7	Hamal	327 53.0 N23 34.2										
16		135 47.6	10 58.9 05.0	2 31.6 59.2	102 53.2 05.5	156 22.2 19.7	Kaus Aust.	83 33.9 S34 22.4										
17		150 50.0	25 58.9 04.3	17 32.6 58.8	117 55.2 05.7	171 24.6 19.6												
18		165 52.5	40 58.9 N22 03.7	32 33.6 N18 58.4	132 57.1 N12 05.9	186 27.0 S10 19.6	Kochab	137 18.8 N74 03.7										
19		180 55.0	55 59.0 03.1	47 34.6 57.9	147 59.1 06.0	201 29.4 19.6	Markab	13 31.2 N15 19.7										
20		195 57.4	70 59.0 02.4	62 35.5 57.5	163 01.1 06.2	216 31.8 19.6	Menkar	314 07.8 N 4 10.8										
21		210 59.9	85 59.1 01.8	77 36.5 57.1	178 03.0 06.4	231 34.3 19.6	Menkent	147 58.9 S36 29.2										
22		226 02.3	100 59.1 01.1	92 37.5 56.7	193 05.0 06.5	246 36.7 19.6	Miaplacidus	221 39.0 S69 49.0										
23		241 04.8	115 59.2 00.5	107 38.5 56.3	208 07.0 06.7	261 39.1 19.6												
THURSDAY		00	256 07.3	130 59.2 N21 59.8	122 39.5 N18 55.8	223 08.9 N12 06.9	276 41.5 S10 19.6	Mirfak	308 30.6 N49 56.5									
	01	271 09.7	145 59.3 59.2	137 40.5 55.4	238 10.9 07.0	291 44.0 19.6	Nunki	75 49.1 S26 16.0										
	02	286 12.2	160 59.3 58.5	152 41.4 55.0	253 12.8 07.2	306 46.4 19.6	Peacock	53 07.4 S56 39.4										
	03	301 14.7	175 59.4 57.9	167 42.4 54.6	268 14.8 07.4	321 48.8 19.6	Pollux	243 19.2 N27 58.3										
	04	316 17.1	190 59.4 57.3	182 43.4 54.1	283 16.8 07.6	336 51.2 19.6	Procyon	244 52.5 N 5 09.9										
	05	331 19.6	205 59.5 56.6	197 44.4 53.7	298 18.7 07.7	351 53.7 19.6												
	06	346 22.1	220 59.6 N21 56.0	212 45.4 N18 53.3	313 20.7 N12 07.9	6 56.1 S10 19.6	Rasalhague	95 59.4 N12 32.5										
	07	1 24.5	235 59.6 55.3	227 46.4 52.9	328 22.7 08.1	21 58.5 19.6	Regulus	207 36.0 N11 51.3										
	08	16 27.0	250 59.7 54.7	242 47.3 52.4	343 24.6 08.2	37 00.9 19.6	Rigel	281 05.5 S 8 10.5										
	09	31 29.5	265 59.7 54.0	257 48.3 52.0	358 26.6 08.4	52 03.3 19.5	Rigel Kent.	139 41.6 S60 56.0										
	10	46 31.9	280 59.8 53.4	272 49.3 51.6	13 28.6 08.6	67 05.8 19.5	Sabik	102 04.0 S15 45.2										
	11	61 34.4	295 59.9 52.7	287 50.3 51.2	28 30.5 08.7	82 08.2 19.5												
	12	76 36.8	310 59.9 N21 52.1	302 51.3 N18 50.7	43 32.5 N12 08.9	97 10.6 S10 19.5	Schedar	349 32.8 N56 39.6										
	13	91 39.3	326 00.0 51.4	317 52.3 50.3	58 34.4 09.1	112 13.0 19.5	Shaula	96 11.8 S37 07.2										
	14	106 41.8	341 00.1 50.8	332 53.2 49.9	73 36.4 09.2	127 15.5 19.5	Sirius	258 27.7 S16 44.9										
	15	121 44.2	356 00.1 50.1	347 54.2 49.5	88 38.4 09.4	142 17.9 19.5	Spica	158 23.5 S11 17.0										
	16	136 46.7	11 00.2 49.4	2 55.2 49.0	103 40.3 09.6	157 20.3 19.5	Suhail	222 47.5 S43 31.8										
	17	151 49.2	26 00.3 48.8	17 56.2 48.6	118 42.3 09.8	172 22.7 19.5												
	18	166 51.6	41 00.4 N21 48.1	32 57.2 N18 48.2	133 44.3 N12 09.9	187 25.2 S10 19.5	Vega	80 33.7 N38 48.2										
	19	181 54.1	56 00.4 47.5	47 58.2 47.8	148 46.2 10.1	202 27.6 19.5	Zuben'ubi	136 57.2 S16 08.4										
	20	196 56.6	71 00.5 46.8	62 59.2 47.3	163 48.2 10.3	217 30.0 19.5												
	21	211 59.0	86 00.6 46.2	78 00.1 46.9	178 50.2 10.4	232 32.5 19.5												
	22	227 01.5	101 00.7 45.5	93 01.1 46.5	193 52.1 10.6	247 34.9 19.5	Venus	235 50.2 15 16										
	23	242 04.0	116 00.8 44.9	108 02.1 46.1	208 54.1 10.8	262 37.3 19.5	Mars	227 07.7 15 50										
							Jupiter	327 13.7 9 09										
						Saturn	20 35.3 5 36											
	h m																	
Mer. Pass.	6 58.3	v 0.0 d 0.6	v 1.0 d 0.4	v 2.0 d 0.2	v 2.4 d 0.0													

UT	SUN		MOON					Lat.	Twilight		Sunrise	Moonrise							
	GHA	Dec	GHA	v	Dec	d	HP		Naut.	Civil		6	7	8	9				
d h	° /	° /	° /	° /	° /	° /	° /	h m	h m	h m	h m	h m	h m	h m	h m				
6	00	180 21.4	N22 36.1	332 50.8	2.2	S27 46.4	1.7 60.0	N 72							03 50				
	01	195 21.3	36.4	347 12.0	2.3	27 44.7	1.8 60.0	N 70							02 52				
	02	210 21.2	36.6	1 33.3	2.3	27 42.9	2.1 60.0	68							02 18				
	03	225 21.1	36.9	15 54.6	2.4	27 40.8	2.3 60.0	66	////	////	00 46			02 30	01 52				
	04	240 20.9	37.2	30 16.0	2.3	27 38.5	2.4 60.0	64	////	////	01 45			01 49	01 32				
	05	255 20.8	37.4	44 37.3	2.4	27 36.1	2.7 60.0	62	////	////	02 18	01 31	01 24	01 20	01 16				
	06	270 20.7	N22 37.7	58 58.7	2.4	S27 33.4	2.9 60.0	60	////	01 10	02 42	00 16	00 47	00 58	01 03				
	07	285 20.6	38.0	73 20.1	2.4	27 30.5	3.1 60.1	N 58	////	01 50	03 01	24 20	00 20	00 40	00 51				
	08	300 20.5	38.2	87 41.5	2.5	27 27.4	3.3 60.1	56	////	02 17	03 17	23 59	24 25	00 25	00 41				
	09	315 20.4	38.5	102 03.0	2.5	27 24.1	3.5 60.1	54	01 04	02 38	03 30	23 42	24 12	00 12	00 33				
TUESDAY	10	330 20.3	38.7	116 24.5	2.5	27 20.6	3.6 60.1	52	01 41	02 55	03 42	23 27	24 00	00 00	00 23				
	11	345 20.2	39.0	130 46.0	2.6	27 17.0	3.9 60.1	50	02 06	03 09	03 52	23 13	23 50	24 16	00 16				
	12	0 20.0	N22 39.3	145 07.6	2.6	S27 13.1	4.1 60.1	45	02 49	03 37	04 14	22 47	23 28	24 00	00 00				
	13	15 19.9	39.5	159 29.2	2.7	27 09.0	4.3 60.1	N 40	03 18	03 59	04 31	22 25	23 11	23 47	24 17				
	14	30 19.8	39.8	173 50.9	2.7	27 04.7	4.5 60.1	35	03 40	04 17	04 46	22 07	22 56	23 36	24 10				
	15	45 19.7	40.0	188 12.6	2.8	27 00.2	4.6 60.1	30	03 58	04 31	04 59	21 52	22 43	23 26	24 03				
	16	60 19.6	40.3	202 34.4	2.9	26 55.6	4.9 60.1	20	04 26	04 55	05 20	21 26	22 21	23 09	23 52				
	17	75 19.5	40.5	216 56.3	2.9	26 50.7	5.1 60.1	N 10	04 48	05 15	05 38	21 03	22 02	22 55	23 42				
	18	90 19.4	N22 40.8	231 18.2	2.9	S26 45.6	5.2 60.1	0	05 07	05 33	05 55	20 42	21 44	22 41	23 33				
	19	105 19.2	41.0	245 40.1	3.1	26 40.4	5.4 60.1	S 10	05 23	05 49	06 12	20 21	21 26	22 27	23 24				
WEDNESDAY	20	120 19.1	41.3	260 02.2	3.0	26 35.0	5.7 60.1	20	05 39	06 06	06 30	19 59	21 06	22 12	23 14				
	21	135 19.0	41.5	274 24.2	3.2	26 29.3	5.8 60.1	30	05 55	06 24	06 51	19 32	20 44	21 54	23 02				
	22	150 18.9	41.8	288 46.4	3.2	26 23.5	6.0 60.1	35	06 03	06 34	07 02	19 17	20 30	21 44	22 56				
	23	165 18.8	42.0	303 08.6	3.3	26 17.5	6.2 60.1	40	06 12	06 46	07 16	18 59	20 15	21 33	22 48				
	00	180 18.7	N22 42.3	317 30.9	3.4	S26 11.3	6.4 60.1	45	06 22	06 59	07 32	18 37	19 57	21 19	22 39				
	01	195 18.6	42.5	331 53.3	3.5	26 04.9	6.5 60.1	S 50	06 33	07 14	07 52	18 09	19 34	21 02	22 29				
	02	210 18.4	42.8	346 15.8	3.5	25 58.4	6.8 60.1	52	06 38	07 21	08 02	17 55	19 23	20 54	22 24				
	03	225 18.3	43.0	0 38.3	3.6	25 51.6	6.9 60.1	54	06 43	07 29	08 12	17 40	19 10	20 45	22 18				
	04	240 18.2	43.3	15 00.9	3.7	25 44.7	7.1 60.1	56	06 49	07 38	08 24	17 21	18 56	20 35	22 12				
	05	255 18.1	43.5	29 23.6	3.8	25 37.6	7.3 60.1	58	06 56	07 48	08 38	16 58	18 39	20 24	22 05				
THURSDAY	06	270 18.0	N22 43.8	43 46.4	3.9	S25 30.3	7.5 60.1	S 60	07 03	07 59	08 55	16 28	18 18	20 10	21 57				
	07	285 17.9	44.0	58 09.3	4.0	25 22.8	7.6 60.1	Lat.	Sunset	Twilight		Moonset							
	08	300 17.8	44.3	72 32.3	4.0	25 15.2	7.8 60.1			Civil	Naut.	6	7	8	9				
	09	315 17.6	44.5	86 55.3	4.2	25 07.4	8.0 60.1												
	10	330 17.5	44.7	101 18.5	4.2	24 59.4	8.1 60.1												
	11	345 17.4	45.0	115 41.7	4.3	24 51.3	8.4 60.1												
	12	0 17.3	N22 45.2	130 05.0	4.5	S24 42.9	8.5 60.1	N 72							06 23				
	13	15 17.2	45.5	144 28.5	4.5	24 34.4	8.6 60.1	N 70							07 19				
	14	30 17.1	45.7	158 52.0	4.6	24 25.8	8.8 60.1	68							07 52				
	15	45 16.9	46.0	173 15.6	4.8	24 17.0	9.0 60.1	66	23 16	////	////			05 41	08 15				
FRIDAY	16	60 16.8	46.2	187 39.4	4.8	24 08.0	9.2 60.1	64	22 14	////	////			06 22	08 34				
	17	75 16.7	46.4	202 03.2	4.9	23 58.8	9.3 60.0	62	21 41	////	////	02 19	04 39	06 50	08 49				
	18	90 16.6	N22 46.7	216 27.1	5.1	S23 49.5	9.4 60.0	60	21 17	22 50	////	03 34	05 16	07 11	09 01				
	19	105 16.5	46.9	230 51.2	5.1	23 40.1	9.6 60.0	N 58	20 57	22 09	////	04 09	05 43	07 28	09 12				
	20	120 16.4	47.1	245 15.3	5.2	23 30.5	9.8 60.0	56	20 41	21 42	////	04 35	06 03	07 42	09 21				
	21	135 16.2	47.4	259 39.5	5.4	23 20.7	9.9 60.0	54	20 28	21 21	22 56	04 55	06 20	07 55	09 30				
	22	150 16.1	47.6	274 03.9	5.4	23 10.8	10.1 60.0	52	20 16	21 04	22 18	05 13	06 35	08 06	09 37				
	23	165 16.0	47.8	288 28.3	5.6	23 00.7	10.2 60.0	50	20 06	20 49	21 52	05 27	06 48	08 15	09 44				
	00	180 15.9	N22 48.1	302 52.9	5.7	S22 50.5	10.3 60.0	45	19 44	20 21	21 10	05 57	07 14	08 36	09 58				
	01	195 15.8	48.3	317 17.6	5.8	22 40.2	10.5 60.0	N 40	19 27	19 59	20 40	06 20	07 34	08 52	10 09				
SATURDAY	02	210 15.6	48.5	331 42.4	5.8	22 29.7	10.7 60.0	35	19 12	19 41	20 18	06 39	07 51	09 06	10 19				
	03	225 15.5	48.8	346 07.2	6.0	22 19.0	10.8 60.0	30	18 59	19 27	20 00	06 56	08 06	09 18	10 27				
	04	240 15.4	49.0	0 32.2	6.2	22 08.2	10.9 60.0	20	18 38	19 02	19 31	07 23	08 31	09 38	10 42				
	05	255 15.3	49.2	14 57.4	6.2	21 57.3	11.1 60.0	N 10	18 20	18 43	19 09	07 47	08 52	09 55	10 54				
	06	270 15.2	N22 49.5	29 22.6	6.3	S21 46.2	11.1 59.9	0	18 03	18 25	18 51	08 09	09 12	10 11	11 06				
	07	285 15.1	49.7	43 47.9	6.4	21 35.1	11.4 59.9	S 10	17 46	18 08	18 35	08 31	09 32	10 28	11 18				
	08	300 14.9	49.9	58 13.3	6.6	21 23.7	11.4 59.9	20	17 28	17 52	18 19	08 54	09 53	10 45	11 30				
	09	315 14.8	50.1	72 38.9	6.7	21 12.3	11.6 59.9	30	17 07	17 33	18 03	09 21	10 17	11 04	11 44				
	10	330 14.7	50.4	87 04.6	6.7	21 00.7	11.7 59.9	35	16 55	17 23	17 55	09 37	10 31	11 15	11 52				
	11	345 14.6	50.6	101 30.3	6.9	20 49.0	11.9 59.9	40	16 41	17 12	17 46	09 56	10 47	11 28	12 01				
SUNDAY	12	0 14.5	N22 50.8	115 56.2	7.0	S20 37.1	11.9 59.9	45	16 25	16 59	17 36	10 18	11 07	11 43	12 12				
	13	15 14.3	51.0	130 22.2	7.1	20 25.2	12.1 59.9	S 50	16 05	16 43	17 24	10 47	11 31	12 02	12 24				
	14	30 14.2	51.3	144 48.3	7.2	20 13.1	12.2 59.9	52	15 56	16 36	17 19	11 01	11 42	12 10	12 30				
	15	45 14.1	51.5	159 14.5	7.4	20 00.9	12.3 59.8	54	15 45	16 28	17 14	11 17	11 55	12 20	12 37				
	16	60 14.0	51.7	173 40.9	7.4	19 48.6	12.5 59.8	56	15 33	16 20	17 08	11 36	12 10	12 31	12 44				
	17	75 13.9	51.9	188 07.3	7.6	19 36.1	12.5 59.8	58	15 19	16 10	17 02	11 59	12 28	12 43	12 52				
	18	90 13.7	N22 52.1	202 33.9	7.6	S19 23.6	12.7 59.8	S 60	15 03	15 59	16 55	12 29	12 49	12 57	13 01				
	19	105 13.6	52.4	217 00.5	7.8	19 10.9	12.7 59.8	SUN								MOON			
	20	120 13.5	52.6	231 27.3	7.9	18 58.2	12.9 59.8	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase				
	21	135 13.4	52.8	245 54.2	7.9	18 45.3	13.0 59.8		00 ^h	12 ^h	Pass.	Upper	Lower						
22	150 13.3	53.0	260 21.1	8.1	18 32.3	13.1 59.8	d	m s	m s	h m	h m	h m	d %						
23	165 13.1	53.2	274 48.2	8.2	S18 19.2	13.1 59.7	6	01 26	01 20	11 59	01 54	14 26	18 92						
	SD 15.8	d 0.2	SD 16.4	16.4	16.3	7	01 15	01 09	11 59	02 57	15 28								

UT	ARIES	VENUS −4.5	MARS +1.6	JUPITER −2.1	SATURN +0.8	STARS		
	GHA ° / ' / "	GHA ° / ' / " Dec ° / ' / "	GHA ° / ' / " Dec ° / ' / "	GHA ° / ' / " Dec ° / ' / "	GHA ° / ' / " Dec ° / ' / "	Name	SHA ° / ' / "	Dec ° / ' / "
F R I D A Y	9 00	257 06.4	131 00.8 N21 44.2	123 03.1 N18 45.6	223 56.1 N12 10.9	277 39.7 S10 19.5	Acamar	315 13.1 S40 12.6
	01	272 08.9	146 00.9 43.5	138 04.1 45.2	238 58.0 11.1	292 42.2 19.5	Achernar	335 21.5 S57 06.9
	02	287 11.3	161 01.0 42.9	153 05.1 44.8	254 00.0 11.3	307 44.6 19.5	Acrux	173 01.3 S63 14.0
	03	302 13.8	176 01.1 . . 42.2	168 06.0 . . 44.4	269 02.0 . . 11.4	322 47.0 . . 19.5	Adhara	255 07.3 S29 00.3
	04	317 16.3	191 01.2 41.6	183 07.0 43.9	284 03.9 11.6	337 49.4 19.5	Aldebaran	290 41.5 N16 33.3
	05	332 18.7	206 01.3 40.9	198 08.0 43.5	299 05.9 11.8	352 51.9 19.4		
	06	347 21.2	221 01.4 N21 40.2	213 09.0 N18 43.1	314 07.9 N12 11.9	7 54.3 S10 19.4	Alioth	166 13.9 N55 50.2
	07	2 23.7	236 01.5 39.6	228 10.0 42.6	329 09.8 12.1	22 56.7 19.4	Alkaid	152 52.7 N49 12.0
	08	17 26.1	251 01.6 38.9	243 11.0 42.2	344 11.8 12.3	37 59.1 19.4	Alnair	27 34.4 S46 50.7
	09	32 28.6	266 01.6 . . 38.2	258 12.0 . . 41.8	359 13.8 . . 12.4	53 01.6 . . 19.4	Alnilam	275 39.4 S 1 11.2
	10	47 31.1	281 01.7 37.6	273 12.9 41.4	14 15.7 12.6	68 04.0 19.4	Alphard	217 49.2 S 8 45.6
	11	62 33.5	296 01.8 36.9	288 13.9 40.9	29 17.7 12.8	83 06.4 19.4		
	12	77 36.0	311 01.9 N21 36.2	303 14.9 N18 40.5	44 19.7 N12 12.9	98 08.9 S10 19.4	Alphecca	126 04.5 N26 38.2
	13	92 38.5	326 02.0 35.6	318 15.9 40.1	59 21.6 13.1	113 11.3 19.4	Alpheratz	357 36.2 N29 12.9
	14	107 40.9	341 02.1 34.9	333 16.9 39.6	74 23.6 13.3	128 13.7 19.4	Aitair	62 01.0 N 8 55.7
	15	122 43.4	356 02.2 . . 34.2	348 17.9 . . 39.2	89 25.6 . . 13.4	143 16.1 . . 19.4	Ankaa	353 08.6 S42 10.6
	16	137 45.8	11 02.4 33.6	3 18.8 38.8	104 27.5 13.6	158 18.6 19.4	Antares	112 17.1 S26 29.1
	17	152 48.3	26 02.5 32.9	18 19.8 38.4	119 29.5 13.8	173 21.0 19.4		
	18	167 50.8	41 02.6 N21 32.2	33 20.8 N18 37.9	134 31.5 N12 14.0	188 23.4 S10 19.4	Arcturus	145 48.9 N19 03.7
	19	182 53.2	56 02.7 31.6	48 21.8 37.5	149 33.4 14.1	203 25.9 19.4	Atria	107 11.9 S69 04.2
	20	197 55.7	71 02.8 30.9	63 22.8 37.1	164 35.4 14.3	218 28.3 19.4	Avior	234 15.7 S59 35.2
	21	212 58.2	86 02.9 . . 30.2	78 23.8 . . 36.6	179 37.4 . . 14.5	233 30.7 . . 19.4	Bellatrix	278 24.6 N 6 22.2
	22	228 00.6	101 03.0 29.5	93 24.8 36.2	194 39.3 14.6	248 33.2 19.4	Betelgeuse	270 53.9 N 7 24.7
	23	243 03.1	116 03.1 28.9	108 25.7 35.8	209 41.3 14.8	263 35.6 19.4		
S A T U R D A Y	10 00	258 05.6	131 03.2 N21 28.2	123 26.7 N18 35.3	224 43.3 N12 15.0	278 38.0 S10 19.4	Canopus	263 53.5 S52 42.5
	01	273 08.0	146 03.4 27.5	138 27.7 34.9	239 45.2 15.1	293 40.4 19.4	Capella	280 24.3 N46 01.2
	02	288 10.5	161 03.5 26.9	153 28.7 34.5	254 47.2 15.3	308 42.9 19.4	Deneb	49 26.4 N45 21.6
	03	303 12.9	176 03.6 . . 26.2	168 29.7 . . 34.0	269 49.2 . . 15.5	323 45.3 . . 19.4	Denebola	182 26.3 N14 26.6
	04	318 15.4	191 03.7 25.5	183 30.7 33.6	284 51.1 15.6	338 47.7 19.4	Diphda	348 48.8 S17 51.5
	05	333 17.9	206 03.8 24.8	198 31.7 33.2	299 53.1 15.8	353 50.2 19.4		
	06	348 20.3	221 04.0 N21 24.2	213 32.6 N18 32.7	314 55.1 N12 16.0	8 52.6 S10 19.4	Dubhe	193 42.7 N61 37.8
	07	3 22.8	236 04.1 23.5	228 33.6 32.3	329 57.0 16.1	23 55.0 19.4	Elnath	278 03.9 N28 37.6
	08	18 25.3	251 04.2 22.8	243 34.6 31.9	344 59.0 16.3	38 57.5 19.4	Eltanin	90 42.3 N51 29.0
	09	33 27.7	266 04.3 . . 22.1	258 35.6 . . 31.4	0 01.0 . . 16.4	53 59.9 . . 19.3	Enif	33 40.0 N 9 58.8
	10	48 30.2	281 04.5 21.4	273 36.6 31.0	15 03.0 16.6	69 02.3 19.3	Fomalhaut	15 15.9 S29 29.8
	11	63 32.7	296 04.6 20.8	288 37.6 30.6	30 04.9 16.8	84 04.8 19.3		
	12	78 35.1	311 04.7 N21 20.1	303 38.6 N18 30.1	45 06.9 N12 16.9	99 07.2 S10 19.3	Gacrux	171 52.9 S57 14.9
	13	93 37.6	326 04.9 19.4	318 39.5 29.7	60 08.9 17.1	114 09.6 19.3	Gienah	175 44.9 S17 40.4
	14	108 40.1	341 05.0 18.7	333 40.5 29.3	75 10.8 17.3	129 12.1 19.3	Hadar	148 37.4 S60 29.3
	15	123 42.5	356 05.1 . . 18.0	348 41.5 . . 28.8	90 12.8 . . 17.4	144 14.5 . . 19.3	Hamal	327 52.9 N23 34.2
	16	138 45.0	11 05.3 17.4	3 42.5 28.4	105 14.8 17.6	159 16.9 19.3	Kaus Aust.	83 33.9 S34 22.4
	17	153 47.4	26 05.4 16.7	18 43.5 28.0	120 16.7 17.8	174 19.4 19.3		
	18	168 49.9	41 05.6 N21 16.0	33 44.5 N18 27.5	135 18.7 N12 17.9	189 21.8 S10 19.3	Kochab	137 18.8 N74 03.7
	19	183 52.4	56 05.7 15.3	48 45.5 27.1	150 20.7 18.1	204 24.2 19.3	Markab	13 31.2 N15 19.7
	20	198 54.8	71 05.8 14.6	63 46.4 26.7	165 22.7 18.3	219 26.7 19.3	Menkar	314 07.8 N 4 10.8
	21	213 57.3	86 06.0 . . 13.9	78 47.4 . . 26.2	180 24.6 . . 18.4	234 29.1 . . 19.3	Menkent	147 58.9 S36 29.2
	22	228 59.8	101 06.1 13.2	93 48.4 25.8	195 26.6 18.6	249 31.5 19.3	Miaplacidus	221 39.1 S69 49.0
	23	244 02.2	116 06.3 12.6	108 49.4 25.4	210 28.6 18.8	264 34.0 19.3		
S U N D A Y	11 00	259 04.7	131 06.4 N21 11.9	123 50.4 N18 24.9	225 30.5 N12 18.9	279 36.4 S10 19.3	Mirfak	308 30.6 N49 56.5
	01	274 07.2	146 06.6 11.2	138 51.4 24.5	240 32.5 19.1	294 38.8 19.3	Nunki	75 49.1 S26 16.0
	02	289 09.6	161 06.7 10.5	153 52.4 24.0	255 34.5 19.3	309 41.3 19.3	Peacock	53 07.4 S56 39.4
	03	304 12.1	176 06.9 . . 09.8	168 53.4 . . 23.6	270 36.5 . . 19.4	324 43.7 . . 19.3	Pollux	243 19.2 N27 58.3
	04	319 14.6	191 07.0 09.1	183 54.3 23.2	285 38.4 19.6	339 46.1 19.3	Procyon	244 52.5 N 5 09.9
	05	334 17.0	206 07.2 08.4	198 55.3 22.7	300 40.4 19.8	354 48.6 19.3		
	06	349 19.5	221 07.4 N21 07.7	213 56.3 N18 22.3	315 42.4 N12 19.9	9 51.0 S10 19.3	Rasalhague	95 59.4 N12 32.5
	07	4 21.9	236 07.5 07.1	228 57.3 21.9	330 44.3 20.1	24 53.4 19.3	Regulus	207 36.0 N11 51.3
	08	19 24.4	251 07.7 06.4	243 58.3 21.4	345 46.3 20.3	39 55.9 19.3	Rigel	281 05.5 S 8 10.5
	09	34 26.9	266 07.8 . . 05.7	258 59.3 . . 21.0	0 48.3 . . 20.4	54 58.3 . . 19.3	Rigel Kent.	139 41.6 S60 56.0
	10	49 29.3	281 08.0 05.0	274 00.3 20.5	15 50.3 20.6	70 00.7 19.3	Sabik	102 04.0 S15 45.3
	11	64 31.8	296 08.2 04.3	289 01.2 20.1	30 52.2 20.7	85 03.2 19.3		
	12	79 34.3	311 08.3 N21 03.6	304 02.2 N18 19.7	45 54.2 N12 20.9	100 05.6 S10 19.3	Schedar	349 32.8 N56 39.6
	13	94 36.7	326 08.5 02.9	319 03.2 19.2	60 56.2 21.1	115 08.1 19.3	Shaula	96 11.7 S37 07.2
	14	109 39.2	341 08.7 02.2	334 04.2 18.8	75 58.1 21.2	130 10.5 19.3	Sirius	258 27.7 S16 44.9
	15	124 41.7	356 08.8 . . 01.5	349 05.2 . . 18.3	91 00.1 . . 21.4	145 12.9 . . 19.3	Spica	158 23.5 S11 17.0
	16	139 44.1	11 09.0 00.8	4 06.2 17.9	106 02.1 21.6	160 15.4 19.3	Suhail	222 47.5 S43 31.8
	17	154 46.6	26 09.2 21 00.1	19 07.2 17.5	121 04.1 21.7	175 17.8 19.3		
	18	169 49.0	41 09.4 N20 59.4	34 08.2 N18 17.0	136 06.0 N12 21.9	190 20.2 S10 19.3	Vega	80 33.7 N38 48.2
	19	184 51.5	56 09.5 58.7	49 09.1 16.6	151 08.0 22.1	205 22.7 19.3	Zuben'ubi	136 57.2 S16 08.4
	20	199 54.0	71 09.7 58.0	64 10.1 16.1	166 10.0 22.2	220 25.1 19.3		
	21	214 56.4	86 09.9 . . 57.3	79 11.1 . . 15.7	181 12.0 . . 22.4	235 27.6 . . 19.3		
	22	229 58.9	101 10.1 56.6	94 12.1 15.3	196 13.9 22.6	250 30.0 19.3	Venus	232 57.7 h m
	23	245 01.4	116 10.3 55.9	109 13.1 14.8	211 15.9 22.7	265 32.4 19.3	Mars	225 21.2 15 45
Mer. Pass. 6 46.5		v 0.1 d 0.7	v 1.0 d 0.4	v 2.0 d 0.2	v 2.4 d 0.0		Jupiter	326 37.7 9 00
							Saturn	20 32.5 5 25

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	9	10	11	12				
	°	'		°	'							°						'	°	'	
F R I D A Y	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m		
	9 00	180	13.0	N22	53.5	289	15.4	8.4	S18	06.1	13.3	59.7	N 72	□	□	□	03 50	02 21	01 38	01 03	
	01	195	12.9		53.7	303	42.8	8.4	17	52.8	13.4	59.7	N 70	□	□	□	02 52	02 01	01 30	01 03	
	02	210	12.8		53.9	318	10.2	8.5	17	39.4	13.5	59.7	68	□	□	□	02 18	01 45	01 23	01 04	
	03	225	12.7		54.1	332	37.7	8.6	17	25.9	13.6	59.7	66	////	////	00 30	01 52	01 32	01 17	01 04	
	04	240	12.5		54.3	347	05.3	8.7	17	12.3	13.6	59.7	64	////	////	01 40	01 32	01 22	01 13	01 04	
	05	255	12.4		54.5	1	33.0	8.9	16	58.7	13.8	59.7	62	////	////	02 14	01 16	01 12	01 09	01 05	
	06	270	12.3	N22	54.7	16	00.9	8.9	S16	44.9	13.8	59.6	60	////	01 03	02 39	01 03	01 04	01 05	01 05	
	07	285	12.2		54.9	30	28.8	9.1	16	31.1	13.9	59.6	N 58	////	01 46	02 59	00 51	00 57	01 02	01 05	
	08	300	12.1		55.2	44	56.9	9.1	16	17.2	14.1	59.6	56	////	02 14	03 15	00 41	00 51	00 59	01 06	
	09	315	11.9		55.4	59	25.0	9.2	16	03.1	14.1	59.6	54	00 58	02 35	03 29	00 32	00 45	00 56	01 06	
	10	330	11.8		55.6	73	53.2	9.4	15	49.0	14.1	59.6	52	01 38	02 53	03 41	00 23	00 40	00 54	01 06	
	11	345	11.7		55.8	88	21.6	9.4	15	34.9	14.3	59.6	50	02 04	03 07	03 51	00 16	00 36	00 52	01 06	
	12	0	11.6	N22	56.0	102	50.0	9.5	S15	20.6	14.3	59.5	45	02 47	03 36	04 13	00 00	00 26	00 47	01 06	
	13	15	11.4		56.2	117	18.5	9.7	15	06.3	14.4	59.5	N 40	03 17	03 58	04 31	24 17	00 17	00 43	01 07	
	14	30	11.3		56.4	131	47.2	9.7	14	51.9	14.5	59.5	35	03 40	04 16	04 46	24 10	00 10	00 39	01 07	
	15	45	11.2		56.6	146	15.9	9.8	14	37.4	14.6	59.5	30	03 58	04 31	04 58	24 03	00 03	00 36	01 07	
	16	60	11.1		56.8	160	44.7	9.9	14	22.8	14.6	59.5	20	04 26	04 55	05 20	23 52	24 31	00 31	01 08	
	17	75	11.0		57.0	175	13.6	10.0	14	08.2	14.7	59.5	N 10	04 49	05 16	05 39	23 42	24 26	00 26	01 08	
	18	90	10.8	N22	57.2	189	42.6	10.1	S13	53.5	14.8	59.4	0	05 07	05 33	05 56	23 33	24 22	00 22	01 09	
	19	105	10.7		57.4	204	11.7	10.2	13	38.7	14.8	59.4	S 10	05 24	05 50	06 13	23 24	24 18	00 18	01 09	
	20	120	10.6		57.6	218	40.9	10.3	13	23.9	14.9	59.4	20	05 40	06 07	06 31	23 14	24 13	00 13	01 09	
	21	135	10.5		57.8	233	10.2	10.4	13	09.0	14.9	59.4	30	05 56	06 26	06 52	23 02	24 07	00 07	01 10	
	22	150	10.3		58.0	247	39.6	10.4	12	54.1	15.0	59.4	35	06 04	06 36	07 04	22 56	24 04	00 04	01 10	
	23	165	10.2		58.2	262	09.0	10.6	12	39.1	15.1	59.4	40	06 13	06 47	07 18	22 48	24 01	00 01	01 11	
S A T U R D A Y	00	180	10.1	N22	58.4	276	38.6	10.6	S12	24.0	15.1	59.3	45	06 23	07 01	07 34	22 39	23 57	25 11	01 11	
	01	195	10.0		58.6	291	08.2	10.7	12	08.9	15.2	59.3	S 50	06 35	07 16	07 54	22 29	23 52	25 12	01 12	
	02	210	9.8		58.8	305	37.9	10.8	11	53.7	15.2	59.3	52	06 40	07 23	08 04	22 24	23 49	25 12	01 12	
	03	225	9.7		59.0	320	07.7	10.9	11	38.5	15.3	59.3	54	06 45	07 31	08 15	22 18	23 47	25 12	01 12	
	04	240	9.6		59.2	334	37.6	10.9	11	23.2	15.4	59.3	56	06 51	07 40	08 27	22 12	23 44	25 13	01 13	
	05	255	9.5		59.4	349	07.5	11.0	11	07.8	15.3	59.2	58	06 58	07 50	08 41	22 05	23 41	25 13	01 13	
	06	270	9.3	N22	59.6	3	37.5	11.1	S10	52.5	15.5	59.2	S 60	07 05	08 02	08 58	21 57	23 37	25 14	01 14	
	07	285	9.2	22	59.8	18	07.6	11.2	10	37.0	15.4	59.2		Lat.	Sunset	Twilight		Moonset			
	08	300	9.1	23	00.0	32	37.8	11.3	10	21.6	15.6	59.2				Civil	Naut.	9	10	11	12
	09	315	9.0		00.2	47	08.1	11.3	10	06.0	15.5	59.2									
	10	330	8.9		00.4	61	38.4	11.4	9	50.5	15.6	59.2									
	11	345	8.7		00.6	76	08.8	11.5	9	34.9	15.6	59.1									
	12	0	08.6	N23	00.8	90	39.3	11.5	S 9	19.3	15.7	59.1	N 72	□	□	□	06 23	09 40	12 06	14 22	
	13	15	08.5		01.0	105	09.8	11.6	9	03.6	15.7	59.1	N 70	□	□	□	07 19	09 57	12 10	14 16	
	14	30	08.4		01.1	119	40.4	11.7	8	47.9	15.8	59.1	68	□	□	□	07 52	10 11	12 14	14 11	
	15	45	08.2		01.3	134	11.1	11.7	8	32.1	15.7	59.1	66	23 35	////	////	08 15	10 22	12 17	14 07	
	16	60	08.1		01.5	148	41.8	11.8	8	16.4	15.9	59.0	64	22 21	////	////	08 34	10 31	12 19	14 04	
	17	75	08.0		01.7	163	12.6	11.9	8	00.5	15.8	59.0	62	21 45	////	////	08 49	10 39	12 21	14 01	
	18	90	07.8	N23	01.9	177	43.5	11.9	S 7	44.7	15.9	59.0	60	21 20	22 58	////	09 01	10 45	12 23	13 58	
	19	105	07.7		02.1	192	14.4	12.0	7	28.8	15.8	59.0	N 58	21 01	22 14	////	09 12	10 51	12 25	13 56	
	20	120	07.6		02.3	206	45.4	12.1	7	13.0	16.0	59.0	56	20 44	21 45	////	09 21	10 56	12 26	13 54	
	21	135	07.5		02.5	221	16.5	12.1	6	57.0	15.9	58.9	54	20 31	21 24	23 03	09 30	11 01	12 28	13 53	
	22	150	07.3		02.6	235	47.6	12.1	6	41.1	16.0	58.9	52	20 18	21 07	22 22	09 37	11 05	12 29	13 51	
	23	165	07.2		02.8	250	18.7	12.3	6	25.1	15.9	58.9	50	20 08	20 52	21 56	09 44	11 08	12 30	13 50	
	S U N D A Y	00	180	07.1	N23	03.0	264	50.0	12.2	S 6	09.2	16.0	58.9	45	19 46	20 23	21 12	09 58	11 17	12 32	13 46
01		195	07.0		03.2	279	21.2	12.3	5	53.2	16.1	58.9	N 40	19 28	20 01	20 42	10 09	11 23	12 34	13 44	
02		210	06.8		03.4	293	52.5	12.4	5	37.1	16.0	58.8	35	19 13	19 43	20 19	10 19	11 29	12 36	13 42	
03		225	06.7		03.5	308	23.9	12.4	5	21.1	16.0	58.8	30	19 01	19 28	20 01	10 27	11 34	12 38	13 40	
04		240	06.6		03.7	322	55.3	12.5	5	05.1	16.1	58.8	20	18 39	19 03	19 33	10 42	11 42	12 40	13 36	
05		255	06.5		03.9	337	26.8	12.5	4	49.0	16.1	58.8	N 10	18 20	18 43	19 10	10 54	11 50	12 42	13 33	
06		270	06.3	N23	04.1	351	58.3	12.5	S 4	32.9	16.1	58.7	0	18 03	18 26	18 52	11 06	11 57	12 44	13 30	
07		285	06.2		04.3	6	29.8	12.6	4	16.8	16.1	58.7	S 10	17 46	18 09	18 35	11 18	12 04	12 46	13 28	
08		300	06.1		04.4	21	01.4	12.7	4	00.7	16.1	58.7	20	17 28	17 52	18 19	11 30	12 11	12 48	13 25	
09		315	06.0		04.6	35	33.1	12.7	3	44.6	16.1	58.7	30	17 07	17 33	18 03	11 44	12 19	12 51	13 21	
10		330	05.8		04.8	50	04.8	12.7	3	28.5	16.1	58.7	35	16 55	17 23	17 54	11 52	12 24	12 52	13 19	
11		345	05.7		05.0	64	36.5	12.7	3	12.4	16.1	58.6	40	16 41	17 11	17 45	12 01	12 29	12 53	13 17	
12		0	05.6	N23	05.1	79	08.2	12.8	S 2	56.3	16.1	58.6	45	16 24	16 58	17 35	12 12	12 35	12 55	13 14	
13		15	05.4		05.3	93	40.0	12.9	2	40.2	16.1	58.6	S 50	16 04	16 42	17 24	12 24	12 42	12 57	13 11	
14		30	05.3		05.5	108	11.9	12.8	2	24.1	16.2	58.6	52	15 55	16 35	17 19	12 30	12 45	12 58	13 10	
15		45	05.2		05.7	122	43.7	12.9	2	07.9	16.1	58.6	54	15 44	16 27	17 1					

UT	ARIES			VENUS −4.5			MARS +1.7			JUPITER −2.1			SATURN +0.7			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
MONDAY	1200	260 03.8	131 10.4 N20 55.2	124 14.1 N18 14.4	226 17.9 N12 22.9	280 34.9 S10 19.3	Acamar	315 13.1 S40 12.5										
	01	275 06.3	146 10.6 54.5	139 15.1 13.9	241 19.8 23.0	295 37.3 19.3	Achernar	335 21.5 S57 06.9										
	02	290 08.8	161 10.8 53.8	154 16.1 13.5	256 21.8 23.2	310 39.7 19.3	Acrux	173 01.4 S63 14.0										
	03	305 11.2	176 11.0 . . 53.1	169 17.0 . . 13.1	271 23.8 . . 23.4	325 42.2 . . 19.3	Adhara	255 07.3 S29 00.3										
	04	320 13.7	191 11.2 52.4	184 18.0 12.6	286 25.8 23.5	340 44.6 19.3	Aldebaran	290 41.5 N16 33.3										
	05	335 16.2	206 11.4 51.7	199 19.0 12.2	301 27.7 23.7	355 47.1 19.3												
	06	350 18.6	221 11.6 N20 51.0	214 20.0 N18 11.7	316 29.7 N12 23.9	10 49.5 S10 19.3	Alioth	166 13.9 N55 50.3										
	07	5 21.1	236 11.8 50.3	229 21.0 11.3	331 31.7 24.0	25 51.9 19.3	Alkaid	152 52.8 N49 12.0										
	08	20 23.5	251 12.0 49.6	244 22.0 10.8	346 33.7 24.2	40 54.4 19.3	Alnair	27 34.4 S46 50.7										
	09	35 26.0	266 12.2 . . 48.9	259 23.0 . . 10.4	1 35.6 . . 24.3	55 56.8 . . 19.3	Alnilam	275 39.4 S 1 11.2										
	10	50 28.5	281 12.4 48.2	274 24.0 10.0	16 37.6 24.5	70 59.3 19.3	Alphard	217 49.2 S 8 45.6										
	11	65 30.9	296 12.6 47.5	289 24.9 09.5	31 39.6 24.7	86 01.7 19.3												
	12	80 33.4	311 12.8 N20 46.8	304 25.9 N18 09.1	46 41.6 N12 24.8	101 04.1 S10 19.3	Alphecca	126 04.5 N26 38.2										
	13	95 35.9	326 13.0 46.1	319 26.9 08.6	61 43.5 25.0	116 06.6 19.3	Alpheratz	357 36.2 N29 13.0										
	14	110 38.3	341 13.2 45.4	334 27.9 08.2	76 45.5 25.2	131 09.0 19.3	Altair	62 01.0 N 8 55.7										
	15	125 40.8	356 13.4 . . 44.7	349 28.9 . . 07.7	91 47.5 . . 25.3	146 11.5 . . 19.3	Ankaa	353 08.6 S42 10.6										
	16	140 43.3	11 13.6 44.0	4 29.9 07.3	106 49.5 25.5	161 13.9 19.3	Antares	112 17.1 S26 29.1										
	17	155 45.7	26 13.8 43.3	19 30.9 06.9	121 51.4 25.7	176 16.3 19.3												
	18	170 48.2	41 14.0 N20 42.5	34 31.9 N18 06.4	136 53.4 N12 25.8	191 18.8 S10 19.3	Arcturus	145 48.9 N19 03.7										
	19	185 50.6	56 14.2 41.8	49 32.8 06.0	151 55.4 26.0	206 21.2 19.3	Atria	107 11.9 S69 04.2										
	20	200 53.1	71 14.4 41.1	64 33.8 05.5	166 57.4 26.1	221 23.7 19.3	Avior	234 15.8 S59 35.2										
	21	215 55.6	86 14.6 . . 40.4	79 34.8 . . 05.1	181 59.3 . . 26.3	236 26.1 . . 19.3	Bellatrix	278 24.6 N 6 22.2										
	22	230 58.0	101 14.8 39.7	94 35.8 04.6	197 01.3 26.5	251 28.5 19.3	Betelgeuse	270 53.9 N 7 24.7										
	23	246 00.5	116 15.1 39.0	109 36.8 04.2	212 03.3 26.6	266 31.0 19.3												
	TUESDAY	1300	261 03.0	131 15.3 N20 38.3	124 37.8 N18 03.7	227 05.3 N12 26.8	281 33.4 S10 19.3	Canopus	263 53.5 S52 42.5									
01		276 05.4	146 15.5 37.6	139 38.8 03.3	242 07.3 27.0	296 35.9 19.3	Capella	280 24.3 N46 01.2										
02		291 07.9	161 15.7 36.9	154 39.8 02.8	257 09.2 27.1	311 38.3 19.3	Deneb	49 26.4 N45 21.6										
03		306 10.4	176 15.9 . . 36.1	169 40.8 . . 02.4	272 11.2 . . 27.3	326 40.8 . . 19.3	Denebola	182 26.3 N14 26.6										
04		321 12.8	191 16.2 35.4	184 41.7 01.9	287 13.2 27.4	341 43.2 19.3	Diphda	348 48.7 S17 51.5										
05		336 15.3	206 16.4 34.7	199 42.7 01.5	302 15.2 27.6	356 45.6 19.3												
06		351 17.8	221 16.6 N20 34.0	214 43.7 N18 01.1	317 17.1 N12 27.8	11 48.1 S10 19.3	Dubhe	193 42.7 N61 37.8										
07		6 20.2	236 16.9 33.3	229 44.7 00.6	332 19.1 27.9	26 50.5 19.3	Elnath	278 03.9 N28 37.6										
08		21 22.7	251 17.1 32.6	244 45.7 18 00.2	347 21.1 28.1	41 53.0 19.3	Eltanin	90 42.3 N51 29.1										
09		36 25.1	266 17.3 . . 31.8	259 46.7 17 59.7	2 23.1 . . 28.2	56 55.4 . . 19.3	Enif	33 39.9 N 9 58.8										
10		51 27.6	281 17.5 31.1	274 47.7 59.3	17 25.0 28.4	71 57.9 19.3	Fomalhaut	15 15.9 S29 29.8										
11		66 30.1	296 17.8 30.4	289 48.7 58.8	32 27.0 28.6	87 00.3 19.3												
12		81 32.5	311 18.0 N20 29.7	304 49.7 N17 58.4	47 29.0 N12 28.7	102 02.7 S10 19.3	Gacrux	171 53.0 S57 14.9										
13		96 35.0	326 18.3 29.0	319 50.6 57.9	62 31.0 28.9	117 05.2 19.3	Gienah	175 44.9 S17 40.4										
14		111 37.5	341 18.5 28.3	334 51.6 57.5	77 33.0 29.1	132 07.6 19.3	Hadar	148 37.5 S60 29.3										
15		126 39.9	356 18.7 . . 27.5	349 52.6 . . 57.0	92 34.9 . . 29.2	147 10.1 . . 19.3	Hamal	327 52.9 N23 34.2										
16		141 42.4	11 19.0 26.8	4 53.6 56.6	107 36.9 29.4	162 12.5 19.3	Kaus Aust.	83 33.9 S34 22.4										
17		156 44.9	26 19.2 26.1	19 54.6 56.1	122 38.9 29.5	177 15.0 19.3												
18		171 47.3	41 19.5 N20 25.4	34 55.6 N17 55.7	137 40.9 N12 29.7	192 17.4 S10 19.3	Kochab	137 18.8 N74 03.7										
19		186 49.8	56 19.7 24.6	49 56.6 55.2	152 42.9 29.9	207 19.9 19.4	Markab	13 31.2 N15 19.7										
20		201 52.3	71 20.0 23.9	64 57.6 54.8	167 44.8 30.0	222 22.3 19.4	Menkar	314 07.8 N 4 10.8										
21		216 54.7	86 20.2 . . 23.2	79 58.6 . . 54.3	182 46.8 . . 30.2	237 24.8 . . 19.4	Menkent	147 58.9 S36 29.2										
22		231 57.2	101 20.5 22.5	94 59.5 53.9	197 48.8 30.3	252 27.2 19.4	Miaplacidus	221 39.1 S69 49.0										
23		246 59.6	116 20.7 21.8	110 00.5 53.4	212 50.8 30.5	267 29.6 19.4												
WEDNESDAY		1400	262 02.1	131 21.0 N20 21.0	125 01.5 N17 53.0	227 52.7 N12 30.7	282 32.1 S10 19.4	Mirfak	308 30.6 N49 56.5									
	01	277 04.6	146 21.2 20.3	140 02.5 52.5	242 54.7 30.8	297 34.5 19.4	Nunki	75 49.0 S26 16.0										
	02	292 07.0	161 21.5 19.6	155 03.5 52.1	257 56.7 31.0	312 37.0 19.4	Peacock	53 07.4 S56 39.4										
	03	307 09.5	176 21.7 . . 18.9	170 04.5 . . 51.6	272 58.7 . . 31.1	327 39.4 . . 19.4	Pollux	243 19.2 N27 58.3										
	04	322 12.0	191 22.0 18.1	185 05.5 51.2	288 00.7 31.3	342 41.9 19.4	Procyon	244 52.5 N 5 09.9										
	05	337 14.4	206 22.3 17.4	200 06.5 50.7	303 02.6 31.5	357 44.3 19.4												
	06	352 16.9	221 22.5 N20 16.7	215 07.5 N17 50.3	318 04.6 N12 31.6	12 46.8 S10 19.4	Rasalhague	95 59.4 N12 32.5										
	07	7 19.4	236 22.8 16.0	230 08.4 49.8	333 06.6 31.8	27 49.2 19.4	Regulus	207 36.0 N11 51.3										
	08	22 21.8	251 23.1 15.2	245 09.4 49.4	348 08.6 31.9	42 51.7 19.4	Rigel	281 05.5 S 8 10.5										
	09	37 24.3	266 23.3 . . 14.5	260 10.4 . . 48.9	3 10.6 . . 32.1	57 54.1 . . 19.4	Rigel Kent.	139 41.6 S60 56.1										
	10	52 26.7	281 23.6 13.8	275 11.4 48.5	18 12.5 32.3	72 56.6 19.4	Sabik	102 03.9 S15 45.2										
	11	67 29.2	296 23.9 13.0	290 12.4 48.0	33 14.5 32.4	87 59.0 19.4												
	12	82 31.7	311 24.1 N20 12.3	305 13.4 N17 47.6	48 16.5 N12 32.6	103 01.5 S10 19.4	Schedar	349 32.7 N56 39.6										
	13	97 34.1	326 24.4 11.6	320 14.4 47.1	63 18.5 32.7	118 03.9 19.4	Shaula	96 11.7 S37 07.2										
	14	112 36.6	341 24.7 10.8	335 15.4 46.6	78 20.5 32.9	133 06.4 19.4	Sirius	258 27.7 S16 44.9										
	15	127 39.1	356 25.0 . . 10.1	350 16.4 . . 46.2	93 22.5 . . 33.1	148 08.8 . . 19.4	Spica	158 23.5 S11 17.0										
	16	142 41.5	11 25.2 09.4	5 17.4 45.7	108 24.4 33.2	163 11.2 19.4	Suhail	222 47.6 S43 31.8										
	17	157 44.0	26 25.5 08.7	20 18.3 45.3	123 26.4 33.4	178 13.7 19.4												
	18	172 46.5	41 25.8 N20 07.9	35 19.3 N17 44.8	138 28.4 N12 33.5	193 16.1 S10 19.4	Vega	80 33.7 N38 48.2										
	19	187 48.9	56 26.1 07.2	50 20.3 44.4	153 30.4 33.7	208 18.6 19.4	Zuben'ubi	136 57.2 S16 08.4										
	20	202 51.4	71 26.4 06.5	65 21.3 43.9	168 32.4 33.9	223 21.0 19.4												
	21	217 53.9	86 26.7 . . 05.7	80 22.3 . . 43.5	183 34.3 . . 34.0	238 23.5 . . 19.4												
	22	232 56.3	101 26.9 05.0	95 23.3 43.0	198 36.3 34.2	253 25.9 19.4	Venus	230 12.3 S 15 15										
	23	247 58.8	116 27.2 04.3	110 24.3 42.6	213 38.3 34.3	268 28.4 19.4	Mars	223 34.8 S 15 40										
								Jupiter	326 02.3 8 50									
							Saturn	20 30.5 5 13										
Mer. Pass. 6 34.7 γ 0.2 d																		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise																	
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	12	13	14	15												
MONDAY	d	h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m										
	12	00	180	04.0	N23	07.2	253	31.8	13.1	N	0	16.9	16.1	58.4	N	72	01	03	(23 28)	22	23									
	01	195	03.9		07.3	268	03.9	13.2	0	33.0	16.0	58.3	68				01	03	00	37	(00 23 19)									
	02	210	03.8		07.5	282	36.1	13.1	0	49.0	16.1	58.3	66				01	04	00	45	(00 23 53)	22	38							
	03	225	03.7		07.7	297	08.2	13.2	1	05.1	16.0	58.3	64	////	////	01	36	01	04	00	51	00	37	(00 23 48)	00	38				
	04	240	03.5		07.8	311	40.4	13.2	1	21.1	15.9	58.3	62	////	////	02	12	01	05	01	06	00	57	00	54					
	05	255	03.4		08.0	326	12.6	13.2	1	37.0	16.0	58.3	60	////		00	57	02	37	01	05	01	05	01	06	01	08			
	06	270	03.3	N23	08.2	340	44.8	13.2	N	1	53.0	16.0	58.2	58	////	01	43	02	57	01	05	01	09	01	13	01	19			
	07	285	03.1		08.3	355	17.0	13.2	2	09.0	15.9	58.2	56	////	02	12	03	14	01	06	01	12	01	20	01	29				
	08	300	03.0		08.5	9	49.2	13.3	2	24.9	15.9	58.2	54	00	52	02	34	03	28	01	06	01	15	01	26	01	38			
	09	315	02.9		08.6	24	21.5	13.2	2	40.8	15.9	58.2	52	01	35	02	51	03	40	01	06	01	18	01	31	01	46			
	10	330	02.8		08.8	38	53.7	13.3	2	56.7	15.8	58.1	50	02	02	03	06	03	51	01	06	01	20	01	36	01	54			
	11	345	02.6		08.9	53	26.0	13.2	3	12.5	15.9	58.1	45	02	46	03	36	04	13	01	06	01	26	01	46	02	09			
	12		0	02.5	N23	09.1	67	58.2	13.3	N	3	28.4	15.8	58.1	N	40	03	16	03	58	04	31	01	07	01	30	01	55	02	22
	13		15	02.4		09.3	82	30.5	13.3	3	44.2	15.7	58.1	35	03	39	04	16	04	45	01	07	01	34	02	02	02	33		
	14		30	02.2		09.4	97	02.8	13.2	3	59.9	15.8	58.1	30	03	58	04	31	04	58	01	07	01	38	02	09	02	43		
	15		45	02.1		09.6	111	35.0	13.3	4	15.7	15.7	58.0	20	04	26	04	56	05	20	01	08	01	44	02	21	03	00		
	16		60	02.0		09.7	126	07.3	13.3	4	31.4	15.7	58.0	N	10	04	49	05	16	05	39	01	08	01	49	02	31	03	15	
	17		75	01.8		09.9	140	39.6	13.2	4	47.1	15.6	58.0	0	05	08	05	34	05	56	01	09	01	54	02	41	03	29		
	18		90	01.7	N23	10.0	155	11.8	13.3	N	5	02.7	15.6	58.0	S	10	05	25	05	51	06	14	01	09	02	00	02	50	03	43
	19		105	01.6		10.2	169	44.1	13.3	5	18.3	15.6	57.9	20	05	41	06	08	06	32	01	09	02	05	03	01	03	58		
	20		120	01.5		10.3	184	16.4	13.2	5	33.9	15.6	57.9	30	05	57	06	27	06	53	01	10	02	12	03	13	04	15		
	21		135	01.3		10.5	198	48.6	13.3	5	49.5	15.5	57.9	35	06	05	06	37	07	05	01	10	02	15	03	20	04	25		
	22		150	01.2		10.6	213	20.9	13.2	6	05.0	15.4	57.9	40	06	15	06	49	07	19	01	11	02	20	03	28	04	37		
	23		165	01.1		10.8	227	53.1	13.2	6	20.4	15.4	57.9	45	06	25	07	02	07	36	01	11	02	25	03	38	04	51		
TUESDAY	13	00	180	00.9	N23	10.9	242	25.3	13.3	N	6	35.8	15.4	57.8	S	50	06	37	07	18	07	56	01	12	02	31	03	49	05	08
	01	195	00.8		11.1	256	57.6	13.2	6	51.2	15.4	57.8	52	06	42	07	25	08	06	01	12	02	33	03	55	05	16			
	02	210	00.7		11.2	271	29.8	13.2	7	06.6	15.3	57.8	54	06	47	07	33	08	17	01	12	02	37	04	01	05	25			
	03	225	00.5		11.4	286	02.0	13.1	7	21.9	15.2	57.8	56	06	53	07	42	08	30	01	13	02	40	04	07	05	35			
	04	240	00.4		11.5	300	34.1	13.2	7	37.1	15.2	57.7	58	07	00	07	52	08	44	01	13	02	44	04	15	05	47			
	05	255	00.3		11.7	315	06.3	13.2	7	52.3	15.2	57.7	S	60	07	07	08	04	09	01	01	14	02	48	04	23	06	00		
	06	270	00.1	N23	11.8	329	38.5	13.1	N	8	07.5	15.1	57.7		Lat.	Sunset	Twilight		Moonset											
	07	285	00.0		12.0	344	10.6	13.1	8	22.6	15.0	57.7					Civil	Naut.			12	13	14	15						
	08	299	59.9		12.1	358	42.7	13.1	8	37.6	15.1	57.7																		
	09	314	59.8		12.2	13	14.8	13.1	8	52.7	14.9	57.6																		
	10	329	59.6		12.4	27	46.9	13.1	9	07.6	14.9	57.6																		
	11	344	59.5		12.5	42	19.0	13.0	9	22.5	14.9	57.6																		
	12	359	59.4	N23	12.7	56	51.0	13.0	N	9	37.4	14.8	57.6	N	72															
	13		14	59.2		12.8	71	23.0	13.0	9	52.2	14.7	57.5	N	70															
	14		29	59.1		12.9	85	55.0	12.9	10	06.9	14.7	57.5	68																
	15		44	59.0		13.1	100	26.9	13.0	10	21.6	14.6	57.5	64	22	26	////	////	////											
	16		59	58.8		13.2	114	58.9	12.9	10	36.2	14.6	57.5	62	21	49	////	////	////											
	17		74	58.7		13.4	129	30.8	12.9	10	50.8	14.5	57.5	60	21	23	23	05	////	////										
	18		89	58.6	N23	13.5	144	02.7	12.8	N11	05.3	14.4	57.4	N	58	21	03	22	18	////	////									
	19		104	58.4		13.6	158	34.5	12.8	11	19.7	14.4	57.4	56	20	47	21	49	////	////										
	20		119	58.3		13.8	173	06.3	12.8	11	34.1	14.3	57.4	54	20	33	21	27	23	10	13	53	15	16	16	41	18	07		
	21		134	58.2		13.9	187	38.1	12.8	11	48.4	14.3	57.4	52	20	21	21	09	22	26	13	51	15	12	16	33	17	55		
	22		149	58.0		14.0	202	09.9	12.7	12	02.7	14.2	57.3	50	20	10	20	54	21	59	13	50	15	08	16	27	17	45		
	23		164	57.9		14.2	216	41.6	12.7	12	16.9	14.1	57.3	45	19	47	20	25	21	14	13	46	15	00	16	13	17	26		
	WEDNESDAY	14	00	179	57.8	N23	14.3	231	13.3	12.6	N12	31.0	14.1	57.3	N	40	19	30	20	02	20	44	13	44	14	52	16	01	17	10
01		194	57.6		14.4	245	44.9	12.7	12	45.1	13.9	57.3	35	19	15	19	44	20	01	13	42	14	46	15	51	16	57			
02		209	57.5		14.5	260	16.6	12.6	12	59.0	14.0	57.3	30	19	02	19	29	20	03	13	40	14	41	15	43	16	45			
03		224	57.4		14.7	274	48.2	12.5	13	13.0	13.8	57.2	20	18	40	19	04	19	34	13	36	14	32	15	28	16	25			
04		239	57.3		14.8	289	19.7	12.5	13	26.8	13.8	57.2	N	10	18	21	18	44	19	11	13	33	14	24	15	15	16	08		
05		254	57.1		14.9	303	51.2	12.5	13	40.6	13.7	57.2	0	18	04	18	26	18	52	13	30	14	16	15	03	15	52			
06		269	57.0	N23	15.1	318	22.7	12.4	N13	54.3	13.6	57.2	S	10	17	46	18	09	18	36	13	28	14	09	14	51	15	36		
07		284	56.9		15.2	332	54.1	12.4	14	07.9	13.5	57.1	20																	

UT	ARIES		VENUS −4.5		MARS +1.7		JUPITER −2.1		SATURN +0.7		STARS			
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
T H U R S D A Y	15 00	263 01.2	131 27.5 N20 03.5	125 25.3 N17 42.1	228 40.3 N12 34.5	283 30.8 S10 19.5	Acamar	315 13.1 S40 12.5						
	01	278 03.7	146 27.8 02.8	140 26.3 41.6	243 42.3 34.7	298 33.3 19.5	Achernar	335 21.5 S57 06.9						
	02	293 06.2	161 28.1 02.0	155 27.3 41.2	258 44.3 34.8	313 35.7 19.5	Acrux	173 01.4 S63 14.0						
	03	308 08.6	176 28.4 . 01.3	170 28.2 . 40.7	273 46.2 . 35.0	328 38.2 . 19.5	Adhara	255 07.3 S29 00.3						
	04	323 11.1	191 28.7 20 00.6	185 29.2 40.3	288 48.2 35.1	343 40.6 19.5	Aldebaran	290 41.5 N16 33.3						
	05	338 13.6	206 29.0 19 59.8	200 30.2 39.8	303 50.2 35.3	358 43.1 19.5								
	06	353 16.0	221 29.3 N19 59.1	215 31.2 N17 39.4	318 52.2 N12 35.5	13 45.5 S10 19.5	Alioth	166 13.9 N55 50.3						
	07	8 18.5	236 29.6 58.4	230 32.2 38.9	333 54.2 35.6	28 48.0 19.5	Alkaid	152 52.8 N49 12.0						
	08	23 21.0	251 29.9 57.6	245 33.2 38.5	348 56.2 35.8	43 50.4 19.5	Alnair	27 34.4 S46 50.7						
	09	38 23.4	266 30.2 . 56.9	260 34.2 . 38.0	3 58.1 . 35.9	58 52.9 . 19.5	Alnilam	275 39.4 S 1 11.2						
	10	53 25.9	281 30.5 56.1	275 35.2 37.5	19 00.1 36.1	73 55.4 19.5	Alphard	217 49.2 S 8 45.6						
	11	68 28.4	296 30.8 55.4	290 36.2 37.1	34 02.1 36.2	88 57.8 19.5								
	12	83 30.8	311 31.1 N19 54.7	305 37.2 N17 36.6	49 04.1 N12 36.4	104 00.3 S10 19.5	Alphecca	126 04.5 N26 38.2						
	13	98 33.3	326 31.4 53.9	320 38.1 36.2	64 06.1 36.6	119 02.7 19.5	Alpheratz	357 36.2 N29 13.0						
	14	113 35.7	341 31.7 53.2	335 39.1 35.7	79 08.1 36.7	134 05.2 19.5	Altair	62 00.9 N 8 55.7						
	15	128 38.2	356 32.1 . 52.4	350 40.1 . 35.3	94 10.0 . 36.9	149 07.6 . 19.5	Ankaa	353 08.5 S42 10.6						
	16	143 40.7	11 32.4 51.7	5 41.1 34.8	109 12.0 37.0	164 10.1 19.5	Antares	112 17.1 S26 29.1						
	17	158 43.1	26 32.7 51.0	20 42.1 34.3	124 14.0 37.2	179 12.5 19.5								
	18	173 45.6	41 33.0 N19 50.2	35 43.1 N17 33.9	139 16.0 N12 37.3	194 15.0 S10 19.5	Arcturus	145 48.9 N19 03.7						
	19	188 48.1	56 33.3 49.5	50 44.1 33.4	154 18.0 37.5	209 17.4 19.5	Atria	107 11.9 S69 04.2						
	20	203 50.5	71 33.6 48.7	65 45.1 33.0	169 20.0 37.7	224 19.9 19.6	Avior	234 15.8 S59 35.2						
	21	218 53.0	86 34.0 . 48.0	80 46.1 . 32.5	184 22.0 . 37.8	239 22.3 . 19.6	Bellatrix	278 24.6 N 6 22.2						
	22	233 55.5	101 34.3 47.2	95 47.1 32.0	199 23.9 38.0	254 24.8 19.6	Betelgeuse	270 53.8 N 7 24.7						
	23	248 57.9	116 34.6 46.5	110 48.1 31.6	214 25.9 38.1	269 27.2 19.6								
F R I D A Y	16 00	264 00.4	131 34.9 N19 45.7	125 49.0 N17 31.1	229 27.9 N12 38.3	284 29.7 S10 19.6	Canopus	263 53.5 S52 42.5						
	01	279 02.9	146 35.3 45.0	140 50.0 30.7	244 29.9 38.5	299 32.1 19.6	Capella	280 24.3 N46 01.2						
	02	294 05.3	161 35.6 44.2	155 51.0 30.2	259 31.9 38.6	314 34.6 19.6	Deneb	49 26.4 N45 21.6						
	03	309 07.8	176 35.9 . 43.5	170 52.0 . 29.7	274 33.9 . 38.8	329 37.1 . 19.6	Denebola	182 26.3 N14 26.6						
	04	324 10.2	191 36.3 42.8	185 53.0 29.3	289 35.8 38.9	344 39.5 19.6	Diphda	348 48.7 S17 51.4						
	05	339 12.7	206 36.6 42.0	200 54.0 28.8	304 37.8 39.1	359 42.0 19.6								
	06	354 15.2	221 36.9 N19 41.3	215 55.0 N17 28.4	319 39.8 N12 39.2	14 44.4 S10 19.6	Dubhe	193 42.7 N61 37.8						
	07	9 17.6	236 37.3 40.5	230 56.0 27.9	334 41.8 39.4	29 46.9 19.6	Elnath	278 03.9 N28 37.6						
	08	24 20.1	251 37.6 39.8	245 57.0 27.4	349 43.8 39.6	44 49.3 19.6	Eltanin	90 42.2 N51 29.1						
	09	39 22.6	266 38.0 . 39.0	260 58.0 . 27.0	4 45.8 . 39.7	59 51.8 . 19.6	Enif	33 39.9 N 9 58.8						
	10	54 25.0	281 38.3 38.3	275 59.0 26.5	19 47.8 39.9	74 54.2 19.6	Fomalhaut	15 15.9 S29 29.8						
	11	69 27.5	296 38.7 37.5	291 00.0 26.0	34 49.8 40.0	89 56.7 19.6								
	12	84 30.0	311 39.0 N19 36.8	306 00.9 N17 25.6	49 51.7 N12 40.2	104 59.2 S10 19.7	Gacrux	171 53.0 S57 14.9						
	13	99 32.4	326 39.4 36.0	321 01.9 25.1	64 53.7 40.3	120 01.6 19.7	Gienah	175 44.9 S17 40.4						
	14	114 34.9	341 39.7 35.3	336 02.9 24.7	79 55.7 40.5	135 04.1 19.7	Hadar	148 37.5 S60 29.3						
	15	129 37.4	356 40.1 . 34.5	351 03.9 . 24.2	94 57.7 . 40.7	150 06.5 . 19.7	Hamal	327 52.9 N23 34.2						
	16	144 39.8	11 40.4 33.8	6 04.9 23.7	109 59.7 40.8	165 09.0 19.7	Kaus Aust.	83 33.9 S34 22.4						
	17	159 42.3	26 40.8 33.0	21 05.9 23.3	125 01.7 41.0	180 11.4 19.7								
	18	174 44.7	41 41.1 N19 32.2	36 06.9 N17 22.8	140 03.7 N12 41.1	195 13.9 S10 19.7	Kochab	137 18.9 N74 03.8						
	19	189 47.2	56 41.5 31.5	51 07.9 22.3	155 05.7 41.3	210 16.3 19.7	Markab	13 31.1 N15 19.7						
	20	204 49.7	71 41.8 30.7	66 08.9 21.9	170 07.6 41.4	225 18.8 19.7	Menkar	314 07.8 N 4 10.8						
	21	219 52.1	86 42.2 . 30.0	81 09.9 . 21.4	185 09.6 . 41.6	240 21.3 . 19.7	Menkent	147 58.9 S36 29.2						
	22	234 54.6	101 42.6 29.2	96 10.9 21.0	200 11.6 41.7	255 23.7 19.7	Miaplacidus	221 39.1 S69 49.0						
	23	249 57.1	116 42.9 28.5	111 11.9 20.5	215 13.6 41.9	270 26.2 19.7								
S A T U R D A Y	17 00	264 59.5	131 43.3 N19 27.7	126 12.8 N17 20.0	230 15.6 N12 42.1	285 28.6 S10 19.7	Mirfak	308 30.6 N49 56.5						
	01	280 02.0	146 43.7 27.0	141 13.8 19.6	245 17.6 42.2	300 31.1 19.7	Nunki	75 49.0 S26 16.0						
	02	295 04.5	161 44.0 26.2	156 14.8 19.1	260 19.6 42.4	315 33.5 19.8	Peacock	53 07.3 S56 39.4						
	03	310 06.9	176 44.4 . 25.5	171 15.8 . 18.6	275 21.6 . 42.5	330 36.0 . 19.8	Pollux	243 19.2 N27 58.3						
	04	325 09.4	191 44.8 24.7	186 16.8 18.2	290 23.5 42.7	345 38.5 19.8	Procyon	244 52.5 N 5 09.9						
	05	340 11.8	206 45.1 23.9	201 17.8 17.7	305 25.5 42.8	0 40.9 19.8								
	06	355 14.3	221 45.5 N19 23.2	216 18.8 N17 17.2	320 27.5 N12 43.0	15 43.4 S10 19.8	Rasalhague	95 59.4 N12 32.6						
	07	10 16.8	236 45.9 22.4	231 19.8 16.8	335 29.5 43.1	30 45.8 19.8	Regulus	207 36.0 N11 51.3						
	08	25 19.2	251 46.3 21.7	246 20.8 16.3	350 31.5 43.3	45 48.3 19.8	Rigel	281 05.5 S 8 10.5						
	09	40 21.7	266 46.6 . 20.9	261 21.8 . 15.8	5 33.5 . 43.5	60 50.8 . 19.8	Rigel Kent.	139 41.6 S60 56.1						
	10	55 24.2	281 47.0 20.1	276 22.8 15.4	20 35.5 43.6	75 53.2 19.8	Sabik	102 03.9 S15 45.2						
	11	70 26.6	296 47.4 19.4	291 23.8 14.9	35 37.5 43.8	90 55.7 19.8								
	12	85 29.1	311 47.8 N19 18.6	306 24.8 N17 14.4	50 39.5 N12 43.9	105 58.1 S10 19.8	Schedar	349 32.7 N56 39.6						
	13	100 31.6	326 48.2 17.9	321 25.7 14.0	65 41.5 44.1	121 00.6 19.8	Shaula	96 11.7 S37 07.2						
	14	115 34.0	341 48.6 17.1	336 26.7 13.5	80 43.4 44.2	136 03.1 19.9	Sirius	258 27.7 S16 44.9						
	15	130 36.5	356 49.0 . 16.3	351 27.7 . 13.0	95 45.4 . 44.4	151 05.5 . 19.9	Spica	158 23.5 S11 17.0						
	16	145 39.0	11 49.4 15.6	6 28.7 12.6	110 47.4 44.5	166 08.0 19.9	Suhail	222 47.6 S43 31.8						
	17	160 41.4	26 49.7 14.8	21 29.7 12.1	125 49.4 44.7	181 10.4 19.9								
	18	175 43.9	41 50.1 N19 14.1	36 30.7 N17 11.6	140 51.4 N12 44.9	196 12.9 S10 19.9	Vega	80 33.7 N38 48.2						
	19	190 46.3	56 50.5 13.3	51 31.7 11.2	155 53.4 45.0	211 15.4 19.9	Zuben'ubi	136 57.2 S16 08.4						
	20	205 48.8	71 50.9 12.5	66 32.7 10.7	170 55.4 45.2	226 17.8 19.9								
	21	220 51.3	86 51.3 . 11.8	81 33.7 . 10.2	185 57.4 . 45.3	241 20.3 . 19.9								
	22	235 53.7	101 51.7 11.0	96 34.7 09.8	200 59.4 45.5	256 22.7 19.9	Venus	227 34.6 15 13						
	23	250 56.2	116 52.1 10.2	111 35.7 09.3	216 01.4 45.6	271 25.2 19.9	Mars	221 48.7 15 36						
								Jupiter	325 27.5 8 41					
								Saturn	20 29.3 5 01					
Mer. Pass. 6 22.9 v 0.3 d 0.8 v 1.0 d 0.5 v 2.0 d 0.2 v 2.5 d 0.0														

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	Dec	d	HP	Naut.	Civil		15	16		17	18			
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m		
1500	179 54.6	N23 17.2	219 41.6	11.6	N17 46.9	12.1	56.8	N 72	□	□	□	□	□	□	□		
	194 54.5	17.3	234 12.2	11.6	17 59.0	12.0	56.8	N 70	□	□	□	□	□	□	□		
	209 54.3	17.5	248 42.8	11.5	18 11.0	11.8	56.7	68	□	□	□	22 38	□	□	□		
	224 54.2	17.6	263 13.3	11.4	18 22.8	11.8	56.7	66	□	□	□	(23 48)	□	□	□		
	239 54.0	17.7	277 43.7	11.4	18 34.6	11.7	56.7	64	///	///	01 33	00 38	(23 58)	□	□		
04	254 53.9	17.8	292 14.1	11.4	18 46.3	11.6	56.7	62	///	///	02 10	00 54	00 51	00 49	00 50		
05	269 53.8	N23 17.9	306 44.5	11.3	N18 57.9	11.5	56.7	60	///	00 52	02 36	01 08	01 12	01 21	01 41		
06	284 53.6	18.0	321 14.8	11.2	19 09.4	11.4	56.6	N 58	///	01 41	02 56	01 19	01 29	01 45	02 13		
07	299 53.5	18.1	335 45.0	11.2	19 20.8	11.3	56.6	56	///	02 11	03 13	01 29	01 43	02 04	02 36		
08	314 53.4	18.2	350 15.2	11.1	19 32.1	11.2	56.6	54	00 48	02 33	03 27	01 38	01 56	02 20	02 56		
09	329 53.2	18.3	4 45.3	11.1	19 43.3	11.1	56.6	52	01 33	02 51	03 39	01 46	02 07	02 34	03 12		
10	344 53.1	18.4	19 15.4	11.0	19 54.4	11.0	56.5	50	02 00	03 06	03 50	01 54	02 16	02 46	03 26		
11	359 53.0	N23 18.5	33 45.4	11.0	N20 05.4	10.9	56.5	45	02 46	03 35	04 13	02 09	02 37	03 12	03 54		
12	14 52.8	18.7	48 15.4	10.9	20 16.3	10.7	56.5	N 40	03 16	03 58	04 31	02 22	02 54	03 32	04 17		
13	29 52.7	18.8	62 45.3	10.9	20 27.0	10.7	56.5	35	03 39	04 16	04 46	02 33	03 08	03 49	04 36		
14	44 52.6	18.9	77 15.2	10.8	20 37.7	10.5	56.5	30	03 58	04 31	04 59	02 43	03 21	04 04	04 52		
15	59 52.4	19.0	91 45.0	10.7	20 48.2	10.5	56.4	20	04 27	04 56	05 21	03 00	03 42	04 29	05 19		
16	74 52.3	19.1	106 14.7	10.7	20 58.7	10.3	56.4	N 10	04 49	05 16	05 39	03 15	04 01	04 50	05 42		
17	89 52.2	N23 19.2	120 44.4	10.7	N21 09.0	10.2	56.4	0	05 08	05 34	05 57	03 29	04 19	05 11	06 04		
18	104 52.0	19.3	135 14.1	10.6	21 19.2	10.1	56.4	S 10	05 25	05 52	06 14	03 43	04 36	05 31	06 26		
19	119 51.9	19.4	149 43.7	10.5	21 29.3	10.0	56.4	20	05 41	06 09	06 33	03 58	04 55	05 53	06 50		
20	134 51.8	19.5	164 13.2	10.5	21 39.3	9.9	56.3	30	05 58	06 28	06 54	04 15	05 17	06 19	07 17		
21	149 51.6	19.6	178 42.7	10.5	21 49.2	9.7	56.3	35	06 07	06 38	07 06	04 25	05 30	06 34	07 34		
22	164 51.5	19.7	193 12.2	10.3	21 58.9	9.6	56.3	40	06 16	06 50	07 20	04 37	05 45	06 51	07 53		
23	179 51.4	N23 19.8	207 41.5	10.4	N22 08.5	9.6	56.3	45	06 26	07 03	07 37	04 51	06 03	07 13	08 16		
00	194 51.2	19.9	222 10.9	10.2	22 18.1	9.4	56.3	S 50	06 38	07 19	07 58	05 08	06 26	07 40	08 45		
01	209 51.1	20.0	236 40.1	10.3	22 27.5	9.2	56.2	52	06 43	07 27	08 08	05 16	06 37	07 53	09 00		
02	224 51.0	20.0	251 09.4	10.1	22 36.7	9.2	56.2	54	06 49	07 35	08 19	05 25	06 49	08 08	09 17		
03	239 50.8	20.1	265 38.5	10.2	22 45.9	9.0	56.2	56	06 55	07 44	08 31	05 35	07 03	08 26	09 37		
04	254 50.7	20.2	280 07.7	10.0	22 54.9	8.9	56.2	58	07 02	07 54	08 46	05 47	07 19	08 48	10 02		
05	269 50.5	N23 20.3	294 36.7	10.1	N23 03.8	8.8	56.1	S 60	07 09	08 06	09 03	06 00	07 40	09 16	10 38		
06	284 50.4	20.4	309 05.8	9.9	23 12.6	8.7	56.1		Lat.	Sunset	Twilight		Moonset				
07	299 50.3	20.5	323 34.7	10.0	23 21.3	8.5	56.1				Civil	Naut.	15	16	17	18	
08	314 50.1	20.6	338 03.7	9.8	23 29.8	8.5	56.1										
09	329 50.0	20.7	352 32.5	9.8	23 38.3	8.3	56.1										
10	344 49.9	20.8	7 01.3	9.8	23 46.6	8.1	56.0										
11	359 49.7	N23 20.9	21 30.1	9.7	N23 54.7	8.0	56.0	N 72	h m	h m	h m	h m	h m	h m	h m	h m	
12	14 49.6	21.0	35 58.8	9.7	24 02.7	7.9	56.0	N 70	□	□	□	□	□	□	□	□	
13	29 49.5	21.0	50 27.5	9.7	24 10.6	7.8	56.0	68	□	□	□	□	□	□	□	□	
14	44 49.3	21.1	64 56.2	9.5	24 18.4	7.7	56.0	66	□	□	□	20 08	□	□	□	□	
15	59 49.2	21.2	79 24.7	9.6	24 26.1	7.5	55.9	64	22 30	///	///	19 32	21 47	□	□	□	
16	74 49.1	21.3	93 53.3	9.5	24 33.6	7.4	55.9	62	21 52	///	///	19 07	20 56	22 46	24 08		
17	89 48.9	N23 21.4	108 21.8	9.4	N24 41.0	7.2	55.9	60	21 26	23 10	///	18 47	20 25	21 55	23 03		
18	104 48.8	21.5	122 50.2	9.4	24 48.2	7.1	55.9	N 58	21 05	22 21	///	18 31	20 02	21 24	22 28		
19	119 48.6	21.6	137 18.6	9.4	24 55.3	7.0	55.9	56	20 49	21 51	///	18 17	19 43	21 01	22 03		
20	134 48.5	21.6	151 47.0	9.3	25 02.3	6.8	55.8	54	20 34	21 29	23 15	18 05	19 27	20 42	21 43		
21	149 48.4	21.7	166 15.3	9.3	25 09.1	6.8	55.8	52	20 22	21 11	22 29	17 55	19 13	20 26	21 26		
22	164 48.2	21.8	180 43.6	9.3	25 15.9	6.5	55.8	50	20 11	20 56	22 01	17 45	19 01	20 12	21 11		
23	179 48.1	N23 21.9	195 11.9	9.2	N25 22.4	6.5	55.8	45	19 49	20 26	21 16	17 26	18 37	19 43	20 42		
00	194 48.0	22.0	209 40.1	9.2	25 28.9	6.3	55.8	N 40	19 31	20 04	20 45	17 10	18 17	19 21	20 19		
01	209 47.8	22.0	224 08.3	9.1	25 35.2	6.1	55.7	35	19 16	19 46	20 22	16 57	18 01	19 03	20 00		
02	224 47.7	22.1	238 36.4	9.1	25 41.3	6.0	55.7	30	19 03	19 30	20 04	16 45	17 47	18 47	19 44		
03	239 47.6	22.2	253 04.5	9.1	25 47.3	5.9	55.7	20	18 41	19 05	19 35	16 25	17 23	18 21	19 16		
04	254 47.4	22.3	267 32.6	9.0	25 53.2	5.8	55.7	N 10	18 22	18 45	19 12	16 08	17 03	17 58	18 52		
05	269 47.3	N23 22.3	282 00.6	9.0	N25 59.0	5.6	55.7	0	18 04	18 27	18 53	15 52	16 43	17 36	18 30		
06	284 47.1	22.4	296 28.6	9.0	26 04.6	5.4	55.6	S 10	17 47	18 10	18 36	15 36	16 24	17 15	18 08		
07	299 47.0	22.5	310 56.6	8.9	26 10.0	5.4	55.6	20	17 28	17 52	18 20	15 20	16 04	16 52	17 44		
08	314 46.9	22.6	325 24.5	8.9	26 15.4	5.1	55.6	30	17 07	17 34	18 04	15 00	15 40	16 26	17 16		
09	329 46.7	22.6	339 52.4	8.9	26 20.5	5.1	55.6	35	16 55	17 23	17 55	14 49	15 27	16 10	17 00		
10	344 46.6	22.7	354 20.3	8.8	26 25.6	4.9	55.6	40	16 41	17 11	17 45	14 36	15 11	15 52	16 41		
11	359 46.5	N23 22.8	8 48.1	8.9	N26 30.5	4.7	55.6	45	16 24	16 58	17 35	14 21	14 52	15 30	16 18		
12	14 46.3	22.9	23 16.0	8.8	26 35.2	4.6	55.5	S 50	16 03	16 42	17 23	14 03	14 28	15 03	15 48		
13	29 46.2	22.9	37 43.8	8.7	26 39.8	4.5	55.5	52	15 54	16 34	17 18	13 54	14 17	14 49	15 33		
14	44 46.1	23.0	52 11.5	8.8	26 44.3	4.3	55.5	54	15 42	16 26	17 12	13 44	14 05	14 34	15 16		
15	59 45.9	23.1	66 39.3	8.8	26 48.6	4.2	55.5	56	15 30	16 17	17 06	13 33	13 50	14 16	14 56		
16	74 45.8	23.1	81 07.0	8.7	26 52.8	4.0	55.5	58	15 15	16 07	17 00	13 21	13 33	13 54	14 30		
17	89 45.6	N23 23.2	95 34.8	8.7	N26 56.8	3.9	55.4	S 60	14 58	15 55	16 52	13 07	13 12	13 25	13 55		
18	104 45.5	23.3	110 02.5	8.7	27 00.7	3.8	55.4		SUN		MOON						
19	119 45.4	23.3	124 30.2	8.6	27 04.5	3.6	55.4	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase		
20	134 45.2	23.4	138 57.8	8.7	27 08.1	3.4	55.4		00 ^h 12 ^h		Pass.	Upper	Lower	d	%		
21	149 45.1	23.5	153 25.5	8.6	27 11.5	3.3	55.4	d	m	s	m	s	h m	h m	d	%	
22	164 45.0	23.5	167 53.1	8.7	N27 14.8	3.2	55.3	15	00 21	00 28	12 00	09 40	22 05	27	7		
23	SD 15.8	d 0.1	SD 15.4	15.3	15.1			16	00 34	00 41	12 01	10 31	22 57	28	3		
								17	00 47	00 54	12 01	11 23	23 50	29	1		

UT	ARIES		VENUS -4.6		MARS +1.7		JUPITER -2.2		SATURN +0.7		STARS			
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
SUNDAY	1800	265 58.7	131 52.5 N19 09.5	126 36.7 N17 08.8	231 03.4 N12 45.8	286 27.7 S10 19.9	Acamar	315 13.1	S40 12.5					
	01	281 01.1	146 53.0 08.7	141 37.7 08.4	246 05.4 45.9	301 30.1 20.0	Achernar	335 21.4	S57 06.8					
	02	296 03.6	161 53.4 07.9	156 38.7 07.9	261 07.3 46.1	316 32.6 20.0	Acrux	173 01.4	S63 14.0					
	03	311 06.1	176 53.8 . . 07.2	171 39.6 . . 07.4	276 09.3 . . 46.2	331 35.1 . . 20.0	Adhara	255 07.3	S29 00.2					
	04	326 08.5	191 54.2 06.4	186 40.6 07.0	291 11.3 46.4	346 37.5 20.0	Aldebaran	290 41.4	N16 33.3					
	05	341 11.0	206 54.6 05.6	201 41.6 06.5	306 13.3 46.5	1 40.0 20.0								
	06	356 13.5	221 55.0 N19 04.9	216 42.6 N17 06.0	321 15.3 N12 46.7	16 42.4 S10 20.0	Alioth	166 14.0	N55 50.3					
	07	11 15.9	236 55.4 04.1	231 43.6 05.5	336 17.3 46.9	31 44.9 20.0	Alkaid	152 52.8	N49 12.0					
	08	26 18.4	251 55.8 03.3	246 44.6 05.1	351 19.3 47.0	46 47.4 20.0	Alnair	27 34.3	S46 50.7					
	09	41 20.8	266 56.3 . . 02.6	261 45.6 . . 04.6	6 21.3 . . 47.2	61 49.8 . . 20.0	Alnilam	275 39.4	S 1 11.2					
	10	56 23.3	281 56.7 01.8	276 46.6 04.1	21 23.3 47.3	76 52.3 20.0	Alphard	217 49.2	S 8 45.6					
	11	71 25.8	296 57.1 01.0	291 47.6 03.7	36 25.3 47.5	91 54.8 20.0								
	12	86 28.2	311 57.5 N19 00.3	306 48.6 N17 03.2	51 27.3 N12 47.6	106 57.2 S10 20.1	Alphecca	126 04.5	N26 38.2					
	13	101 30.7	326 58.0 18 59.5	321 49.6 02.7	66 29.3 47.8	121 59.7 20.1	Alpheratz	357 36.1	N29 13.0					
	14	116 33.2	341 58.4 58.7	336 50.6 02.2	81 31.3 47.9	137 02.1 20.1	Altair	62 00.9	N 8 55.7					
	15	131 35.6	356 58.8 . . 58.0	351 51.6 . . 01.8	96 33.3 . . 48.1	152 04.6 . . 20.1	Ankaa	353 08.5	S42 10.5					
	16	146 38.1	11 59.2 57.2	6 52.6 01.3	111 35.2 48.2	167 07.1 20.1	Antares	112 17.1	S26 29.1					
	17	161 40.6	26 59.7 56.4	21 53.6 00.8	126 37.2 48.4	182 09.5 20.1								
	18	176 43.0	42 00.1 N18 55.7	36 54.6 N17 00.4	141 39.2 N12 48.5	197 12.0 S10 20.1	Arcturus	145 48.9	N19 03.7					
	19	191 45.5	57 00.6 54.9	51 55.5 16 59.9	156 41.2 48.7	212 14.5 20.1	Atria	107 11.9	S69 04.2					
	20	206 48.0	72 01.0 54.1	66 56.5 59.4	171 43.2 48.9	227 16.9 20.1	Avior	234 15.8	S59 35.2					
	21	221 50.4	87 01.4 . . 53.3	81 57.5 . . 58.9	186 45.2 . . 49.0	242 19.4 . . 20.1	Bellatrix	278 24.6	N 6 22.2					
	22	236 52.9	102 01.9 52.6	96 58.5 58.5	201 47.2 49.2	257 21.9 20.2	Beteigeuse	270 53.8	N 7 24.7					
	23	251 55.3	117 02.3 51.8	111 59.5 58.0	216 49.2 49.3	272 24.3 20.2								
MONDAY	1900	266 57.8	132 02.8 N18 51.0	127 00.5 N16 57.5	231 51.2 N12 49.5	287 26.8 S10 20.2	Canopus	263 53.5	S52 42.5					
	01	282 00.3	147 03.2 50.2	142 01.5 57.0	246 53.2 49.6	302 29.3 20.2	Capella	280 24.3	N46 01.2					
	02	297 02.7	162 03.7 49.5	157 02.5 56.6	261 55.2 49.8	317 31.7 20.2	Deneb	49 26.3	N45 21.6					
	03	312 05.2	177 04.1 . . 48.7	172 03.5 . . 56.1	276 57.2 . . 49.9	332 34.2 . . 20.2	Denebola	182 26.3	N14 26.6					
	04	327 07.7	192 04.6 47.9	187 04.5 55.6	291 59.2 50.1	347 36.7 20.2	Diphda	348 48.7	S17 51.4					
	05	342 10.1	207 05.0 47.1	202 05.5 55.2	307 01.2 50.2	2 39.1 20.2								
	06	357 12.6	222 05.5 N18 46.4	217 06.5 N16 54.7	322 03.2 N12 50.4	17 41.6 S10 20.2	Dubhe	193 42.8	N61 37.8					
	07	12 15.1	237 05.9 45.6	232 07.5 54.2	337 05.2 50.5	32 44.1 20.3	Elnath	278 03.9	N28 37.6					
	08	27 17.5	252 06.4 44.8	247 08.5 53.7	352 07.2 50.7	47 46.5 20.3	Eltanin	90 42.2	N51 29.1					
	09	42 20.0	267 06.8 . . 44.0	262 09.5 . . 53.3	7 09.2 . . 50.8	62 49.0 . . 20.3	Enif	33 39.9	N 9 58.8					
	10	57 22.5	282 07.3 43.3	277 10.5 52.8	22 11.2 51.0	77 51.5 20.3	Fomalhaut	15 15.9	S29 29.8					
	11	72 24.9	297 07.8 42.5	292 11.5 52.3	37 13.2 51.1	92 53.9 20.3								
	12	87 27.4	312 08.2 N18 41.7	307 12.4 N16 51.8	52 15.2 N12 51.3	107 56.4 S10 20.3	Gacrux	171 53.0	S57 14.9					
	13	102 29.8	327 08.7 40.9	322 13.4 51.4	67 17.1 51.4	122 58.9 20.3	Gienah	175 44.9	S17 40.4					
	14	117 32.3	342 09.2 40.2	337 14.4 50.9	82 19.1 51.6	138 01.3 20.3	Hadar	148 37.5	S60 29.4					
	15	132 34.8	357 09.6 . . 39.4	352 15.4 . . 50.4	97 21.1 . . 51.7	153 03.8 . . 20.3	Hamal	327 52.9	N23 34.2					
	16	147 37.2	12 10.1 38.6	7 16.4 49.9	112 23.1 51.9	168 06.3 20.4	Kaus Aust.	83 33.8	S34 22.4					
	17	162 39.7	27 10.6 37.8	22 17.4 49.4	127 25.1 52.0	183 08.7 20.4								
	18	177 42.2	42 11.0 N18 37.0	37 18.4 N16 49.0	142 27.1 N12 52.2	198 11.2 S10 20.4	Kochab	137 18.9	N74 03.8					
	19	192 44.6	57 11.5 36.3	52 19.4 48.5	157 29.1 52.4	213 13.7 20.4	Markab	13 31.1	N15 19.7					
	20	207 47.1	72 12.0 35.5	67 20.4 48.0	172 31.1 52.5	228 16.1 20.4	Menkar	314 07.8	N 4 10.8					
	21	222 49.6	87 12.5 . . 34.7	82 21.4 . . 47.5	187 33.1 . . 52.7	243 18.6 . . 20.4	Menkent	147 58.9	S36 29.2					
	22	237 52.0	102 13.0 33.9	97 22.4 47.1	202 35.1 52.8	258 21.1 20.4	Miaplacidus	221 39.2	S69 49.0					
	23	252 54.5	117 13.5 33.2	112 23.4 46.6	217 37.1 53.0	273 23.5 20.4								
TUESDAY	2000	267 57.0	132 13.9 N18 32.4	127 24.4 N16 46.1	232 39.1 N12 53.1	288 26.0 S10 20.5	Mirfak	308 30.5	N49 56.5					
	01	282 59.4	147 14.4 31.6	142 25.4 45.6	247 41.1 53.3	303 28.5 20.5	Nunki	75 49.0	S26 16.0					
	02	298 01.9	162 14.9 30.8	157 26.4 45.2	262 43.1 53.4	318 31.0 20.5	Peacock	53 07.3	S56 39.4					
	03	313 04.3	177 15.4 . . 30.0	172 27.4 . . 44.7	277 45.1 . . 53.6	333 33.4 . . 20.5	Pollux	243 19.2	N27 58.3					
	04	328 06.8	192 15.9 29.2	187 28.4 44.2	292 47.1 53.7	348 35.9 20.5	Procyon	244 52.5	N 5 09.9					
	05	343 09.3	207 16.4 28.5	202 29.4 43.7	307 49.1 53.9	3 38.4 20.5								
	06	358 11.7	222 16.9 N18 27.7	217 30.4 N16 43.2	322 51.1 N12 54.0	18 40.8 S10 20.5	Rasalhague	95 59.4	N12 32.6					
	07	13 14.2	237 17.4 26.9	232 31.4 42.8	337 53.1 54.2	33 43.3 20.5	Regulus	207 36.0	N11 51.3					
	08	28 16.7	252 17.9 26.1	247 32.3 42.3	352 55.1 54.3	48 45.8 20.6	Rigel	281 05.5	S 8 10.5					
	09	43 19.1	267 18.4 . . 25.3	262 33.3 . . 41.8	7 57.1 . . 54.5	63 48.3 . . 20.6	Rigel Kent.	139 41.6	S60 56.1					
	10	58 21.6	282 18.9 24.5	277 34.3 41.3	22 59.1 54.6	78 50.7 20.6	Sabik	102 03.9	S15 45.2					
	11	73 24.1	297 19.4 23.8	292 35.3 40.8	38 01.1 54.8	93 53.2 20.6								
	12	88 26.5	312 19.9 N18 23.0	307 36.3 N16 40.4	53 03.1 N12 54.9	108 55.7 S10 20.6	Schedar	349 32.7	N56 39.6					
	13	103 29.0	327 20.4 22.2	322 37.3 39.9	68 05.1 55.1	123 58.1 20.6	Shaula	96 11.7	S37 07.2					
	14	118 31.4	342 20.9 21.4	337 38.3 39.4	83 07.1 55.2	139 00.6 20.6	Sirius	258 27.7	S16 44.9					
	15	133 33.9	357 21.4 . . 20.6	352 39.3 . . 38.9	98 09.1 . . 55.4	154 03.1 . . 20.6	Spica	158 23.5	S11 17.0					
	16	148 36.4	12 21.9 19.8	7 40.3 38.4	113 11.1 55.5	169 05.6 20.7	Suhail	222 47.6	S43 31.7					
	17	163 38.8	27 22.5 19.1	22 41.3 38.0	128 13.1 55.7	184 08.0 20.7								
	18	178 41.3	42 23.0 N18 18.3	37 42.3 N16 37.5	143 15.1 N12 55.8	199 10.5 S10 20.7	Vega	80 33.7	N38 48.2					
	19	193 43.8	57 23.5 17.5	52 43.3 37.0	158 17.1 56.0	214 13.0 20.7	Zuben'ubi	136 57.2	S16 08.4					
	20	208 46.2	72 24.0 16.7	67 44.3 36.5	173 19.1 56.1	229 15.4 20.7								
	21	223 48.7	87 24.5 . . 15.9	82 45.3 . . 36.0	188 21.1 . . 56.3	244 17.9 . . 20.7								
	22	238 51.2	102 25.1 15.1	97 46.3 35.6	203 23.1 56.4	259 20.4 20.7								
	23	253 53.6	117 25.6 14.3	112 47.3 35.1	218 25.1 56.6	274 22.9 20.7								
											SHA		Mer.Pass.	
											Venus		225 04.9 15 11	
											Mars		220 02.7 15 31	
											Jupiter		324 53.4 8 31	
											Saturn		20 29.0 4 49	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise						
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	18	19	20	21		
SUNDAY	d	h																	
	179	44.8	N23	23.6	182	20.8	8.6	N27	18.0	3.0	55.3	N 72							
	01	194	44.7		23.6	196	48.4	8.6	27	21.0	2.9	55.3	N 70						
	02	209	44.6		23.7	211	16.0	8.6	27	23.9	2.7	55.3	68						
	03	224	44.4		23.8	225	43.6	8.6	27	26.6	2.6	55.3	66						
	04	239	44.3		23.8	240	11.2	8.6	27	29.2	2.4	55.3	64	////	////	01 31			
	05	254	44.1		23.9	254	38.8	8.6	27	31.6	2.3	55.2	60	////	00 50	02 36	01 41		
	06	269	44.0	N23	23.9	269	06.4	8.6	N27	33.9	2.1	55.2	N 58	////	01 40	02 56	02 13		
	07	284	43.9		24.0	283	34.0	8.6	27	36.0	2.0	55.2	56	////	02 10	03 13	02 36		
	08	299	43.7		24.1	298	01.6	8.6	27	38.0	1.9	55.2	54	00 45	02 33	03 27	02 56		
	09	314	43.6		24.1	312	29.2	8.6	27	39.9	1.6	55.2	52	01 32	02 51	03 39	03 12		
	10	329	43.5		24.2	326	56.8	8.6	27	41.5	1.6	55.1	50	02 00	03 06	03 50	03 26		
	11	344	43.3		24.2	341	24.4	8.6	27	43.1	1.4	55.1	45	02 46	03 35	04 13	03 54		
	12	359	43.2	N23	24.3	355	52.0	8.6	N27	44.5	1.2	55.1	N 40	03 16	03 58	04 31	04 17		
	13	14	43.0		24.3	10	19.6	8.7	27	45.7	1.2	55.1	35	03 39	04 16	04 46	04 36		
	14	29	42.9		24.4	24	47.3	8.6	27	46.9	0.9	55.1	30	03 58	04 32	04 59	04 52		
	15	44	42.8		24.4	39	14.9	8.7	27	47.8	0.8	55.1	20	04 27	04 57	05 21	05 19		
	16	59	42.6		24.5	53	42.6	8.6	27	48.6	0.7	55.0	N 10	04 50	05 17	05 40	05 42		
	17	74	42.5		24.5	68	10.2	8.7	27	49.3	0.5	55.0	0	05 09	05 35	05 58	06 04		
	18	89	42.4	N23	24.6	82	37.9	8.7	N27	49.8	0.4	55.0	S 10	05 26	05 52	06 15	06 26		
	19	104	42.2		24.6	97	05.6	8.7	27	50.2	0.2	55.0	20	05 42	06 10	06 34	06 50		
	20	119	42.1		24.7	111	33.3	8.8	27	50.4	0.1	55.0	30	05 59	06 29	06 55	07 17		
	21	134	41.9		24.7	126	01.1	8.7	27	50.5	0.1	55.0	35	06 07	06 39	07 07	07 34		
	22	149	41.8		24.8	140	28.8	8.8	27	50.4	0.2	54.9	40	06 17	06 51	07 21	07 53		
	23	164	41.7		24.8	154	56.6	8.8	27	50.2	0.3	54.9	45	06 27	07 04	07 38	08 16		
MONDAY	00	179	41.5	N23	24.9	169	24.4	8.9	N27	49.9	0.5	54.9	S 50	06 39	07 21	07 59	08 45		
	01	194	41.4		24.9	183	52.3	8.8	27	49.4	0.6	54.9	52	06 44	07 28	08 09	09 00		
	02	209	41.3		25.0	198	20.1	8.9	27	48.8	0.8	54.9	54	06 50	07 36	08 20	09 17		
	03	224	41.1		25.0	212	48.0	8.9	27	48.0	0.9	54.9	56	06 56	07 45	08 33	09 37		
	04	239	41.0		25.1	227	15.9	9.0	27	47.1	1.1	54.9	58	07 03	07 56	08 48	10 02		
	05	254	40.9		25.1	241	43.9	9.0	27	46.0	1.2	54.8	S 60	07 10	08 07	09 05	10 38		
	06	269	40.7	N23	25.1	256	11.9	9.0	N27	44.8	1.4	54.8							
	07	284	40.6		25.2	270	39.9	9.1	27	43.4	1.5	54.8	Lat.	Sunset	Twilight		Moonset		
	08	299	40.4		25.2	285	08.0	9.0	27	41.9	1.6	54.8			Civil	Naut.	18	19	
	09	314	40.3		25.3	299	36.0	9.2	27	40.3	1.8	54.8					20	21	
	10	329	40.2		25.3	314	04.2	9.1	27	38.5	1.9	54.8							
	11	344	40.0		25.3	328	32.3	9.2	27	36.6	2.0	54.7	N 72						
	12	359	39.9	N23	25.4	343	00.5	9.3	N27	34.6	2.2	54.7	N 70						
	13	14	39.8		25.4	357	28.8	9.3	27	32.4	2.4	54.7	68						
	14	29	39.6		25.4	11	57.1	9.3	27	30.0	2.4	54.7	66						
	15	44	39.5		25.5	26	25.4	9.4	27	27.6	2.6	54.7	64	22 32	////	////			
	16	59	39.3		25.5	40	53.8	9.4	27	25.0	2.8	54.7	62	21 54	////	////	24 08	00 08	
	17	74	39.2		25.5	55	22.2	9.5	27	22.2	2.9	54.7	60	21 27	23 14	////	23 03	23 39	
	18	89	39.1	N23	25.6	69	50.7	9.5	N27	19.3	3.0	54.6	N 58	21 07	22 23	////	22 28	23 09	
	19	104	38.9		25.6	84	19.2	9.6	27	16.3	3.1	54.6	56	20 50	21 53	////	22 03	22 46	
	20	119	38.8		25.6	98	47.8	9.6	27	13.2	3.3	54.6	54	20 36	21 30	23 18	21 43	22 28	
	21	134	38.7		25.7	113	16.4	9.7	27	09.9	3.4	54.6	52	20 23	21 12	22 31	21 26	22 12	
	22	149	38.5		25.7	127	45.1	9.8	27	06.5	3.6	54.6	50	20 12	20 57	22 03	21 11	21 58	
	23	164	38.4		25.7	142	13.9	9.8	27	02.9	3.7	54.6	45	19 50	20 27	21 17	20 42	21 31	
	TUESDAY	00	179	38.2	N23	25.8	156	42.7	9.8	N26	59.2	3.8	54.6	N 40	19 32	20 05	20 46	20 19	
01		194	38.1		25.8	171	11.5	9.9	26	55.4	3.9	54.6	35	19 17	19 46	20 23	20 00		
02		209	38.0		25.8	185	40.4	10.0	26	51.5	4.1	54.5	30	19 04	19 31	20 05	19 44		
03		224	37.8		25.8	200	09.4	10.0	26	47.4	4.2	54.5	20	18 42	19 06	19 35	19 16		
04		239	37.7		25.9	214	38.4	10.0	26	43.2	4.3	54.5	N 10	18 23	18 46	19 13	18 52		
05		254	37.6		25.9	229	07.4	10.2	26	38.9	4.5	54.5	0	18 05	18 28	18 54	18 30		
06		269	37.4	N23	25.9	243	36.6	10.2	N26	34.4	4.6	54.5	S 10	17 48	18 10	18 37	18 08		
07		284	37.3		25.9	258	05.8	10.2	26	29.8	4.7	54.5	20	17 29	17 53	18 21	17 44		
08		299	37.1		26.0	272	35.0	10.4	26	25.1	4.9	54.5	30	17 08	17 34	18 04	17 16		
09		314	37.0		26.0	287	04.4	10.3	26	20.2	4.9	54.5	35	16 55	17 24	17 55	17 00		
10		329	36.9		26.0	301	33.7	10.5	26	15.3	5.1	54.4	40	16 41	17 12	17 46	16 41		
11		344	36.7		26.0	316	03.2	10.5	26	10.2	5.2	54.4	45	16 24	16 58	17 35	16 18		
12		359	36.6	N23	26.0	330	32.7	10.6	N26	05.0	5.4	54.4	S 50	16 04	16 42	17 24	15 48		
13		14	36.5		26.1	345	02.3	10.6	25	59.6	5.4	54.4	52	15 54	16 35	17 18	15 33		
14		29	36.3		26.1	359	31.9	10.7	25	54.2	5.6	54.4	54	15 43	16 26	17 13	15 16		
15		44	36.2		26.1	14	01.6	10.8	25	48.6	5.7	54.4	56	15 30	16 17	17 07	14 56		
16		59	36.0		26.1	28	31.4	10.8	25	42.9	5.8	54.4	58	15 15	16 07	17 00	14 30		
17		74	35.9		26.1	43	01.2	11.0	25	37.1	5.9	54.4	S 60	14 58	15 55	16 52	13 55		
18		89	35.8	N23	26.1	57	31.2	10.9	N25	31.2	6.1	54.4	SUN		MOON				
19		104	35.6		26.2	72	01.1	11.1	25	25.1	6.2	54.3	Day	Eqn. of Time	Mer.	Mer. Pass.	Age	Phase	
20		119	35.5		26.2	86	31.2	11.1	25	18.9	6.2	54.3							
21		134	35.4		26.2	101	01.3	11.2	25	12.7	6.4	54.3		00 ^h	12 ^h	Pass.	Upper	Lower	
22		149	35.2		26.2	115	31.5	11.3	25	06.3	6.5	54.3	d	m	s	m	s	h	m
23		164	35.1		26.2	130	01.8	11.3	N24	59.8	6.7	54.3	18	01	00	01	07	12	01
		SD	15.8	d	0.0	SD	15.0	14.9	14.8				19	01	14	01	20	12	01
												20	01	27	01	33	12	02	



UT	ARIES	VENUS -4.6	MARS +1.7	JUPITER -2.2	SATURN +0.7	STARS		
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA Dec
WEDNESDAY	21 00 268 56.1	132 26.1 N18 13.5	127 48.3 N16 34.6	233 27.1 N12 56.7	289 25.3 S10 20.8	Acamar	315 13.1 S40 12.5	
	01 283 58.6	147 26.6 12.8	142 49.3 34.1	248 29.1 56.9	304 27.8 20.8	Achernar	335 21.4 S57 06.8	
	02 299 01.0	162 27.2 12.0	157 50.3 33.6	263 31.1 57.0	319 30.3 20.8	Acrux	173 01.4 S63 14.0	
	03 314 03.5	177 27.7 11.2	172 51.3 33.1	278 33.1 57.2	334 32.8 20.8	Adhara	255 07.3 S29 00.2	
	04 329 05.9	192 28.2 10.4	187 52.3 32.7	293 35.1 57.3	349 35.2 20.8	Aldebaran	290 41.4 N16 33.3	
	05 344 08.4	207 28.8 09.6	202 53.3 32.2	308 37.1 57.5	4 37.7 20.8			
	06 359 10.9	222 29.3 N18 08.8	217 54.3 N16 31.7	323 39.1 N12 57.6	19 40.2 S10 20.8	Alioth	166 14.0 N55 50.3	
	07 14 13.3	237 29.9 08.0	232 55.3 31.2	338 41.1 57.8	34 42.7 20.9	Alkaid	152 52.8 N49 12.0	
	08 29 15.8	252 30.4 07.2	247 56.3 30.7	353 43.1 57.9	49 45.1 20.9	Alnair	27 34.3 S46 50.7	
	09 44 18.3	267 30.9 06.4	262 57.2 30.2	8 45.1 58.1	64 47.6 20.9	Alnilam	275 39.4 S 1 11.2	
	10 59 20.7	282 31.5 05.7	277 58.2 29.8	23 47.1 58.2	79 50.1 20.9	Alphard	217 49.2 S 8 45.6	
	11 74 23.2	297 32.0 04.9	292 59.2 29.3	38 49.1 58.4	94 52.6 20.9			
	12 89 25.7	312 32.6 N18 04.1	308 00.2 N16 28.8	53 51.2 N12 58.5	109 55.0 S10 20.9	Alphecca	126 04.5 N26 38.2	
	13 104 28.1	327 33.1 03.3	323 01.2 28.3	68 53.2 58.6	124 57.5 20.9	Alpheratz	357 36.1 N29 13.0	
	14 119 30.6	342 33.7 02.5	338 02.2 27.8	83 55.2 58.8	140 00.0 21.0	Altair	62 00.9 N 8 55.8	
	15 134 33.1	357 34.2 01.7	353 03.2 27.3	98 57.2 58.9	155 02.5 21.0	Ankaa	353 08.5 S42 10.5	
	16 149 35.5	12 34.8 00.9	8 04.2 26.9	113 59.2 59.1	170 04.9 21.0	Antares	112 17.1 S26 29.1	
	17 164 38.0	27 35.3 18 00.1	23 05.2 26.4	129 01.2 59.2	185 07.4 21.0			
	18 179 40.4	42 35.9 N17 59.3	38 06.2 N16 25.9	144 03.2 N12 59.4	200 09.9 S10 21.0	Arcturus	145 48.9 N19 03.7	
	19 194 42.9	57 36.5 58.5	53 07.2 25.4	159 05.2 59.5	215 12.4 21.0	Atria	107 11.9 S69 04.2	
	20 209 45.4	72 37.0 57.7	68 08.2 24.9	174 07.2 59.7	230 14.8 21.0	Avior	234 15.8 S59 35.2	
	21 224 47.8	87 37.6 56.9	83 09.2 24.4	189 09.2 12 59.8	245 17.3 21.1	Bellatrix	278 24.6 N 6 22.3	
	22 239 50.3	102 38.2 56.2	98 10.2 23.9	204 11.2 13 00.0	260 19.8 21.1	Betelgeuse	270 53.8 N 7 24.7	
	23 254 52.8	117 38.7 55.4	113 11.2 23.5	219 13.2 00.1	275 22.3 21.1			
THURSDAY	22 00 269 55.2	132 39.3 N17 54.6	128 12.2 N16 23.0	234 15.2 N13 00.3	290 24.7 S10 21.1	Canopus	263 53.5 S52 42.5	
	01 284 57.7	147 39.9 53.8	143 13.2 22.5	249 17.2 00.4	305 27.2 21.1	Capella	280 24.3 N46 01.2	
	02 300 00.2	162 40.4 53.0	158 14.2 22.0	264 19.2 00.6	320 29.7 21.1	Deneb	49 26.3 N45 21.6	
	03 315 02.6	177 41.0 52.2	173 15.2 21.5	279 21.2 00.7	335 32.2 21.2	Denebola	182 26.3 N14 26.6	
	04 330 05.1	192 41.6 51.4	188 16.2 21.0	294 23.2 00.9	350 34.7 21.2	Diphda	348 48.7 S17 51.4	
	05 345 07.6	207 42.2 50.6	203 17.2 20.5	309 25.2 01.0	5 37.1 21.2			
	06 0 10.0	222 42.8 N17 49.8	218 18.2 N16 20.0	324 27.2 N13 01.2	20 39.6 S10 21.2	Dubhe	193 42.8 N61 37.8	
	07 15 12.5	237 43.3 49.0	233 19.2 19.6	339 29.2 01.3	35 42.1 21.2	Elnath	278 03.9 N28 37.6	
	08 30 14.9	252 43.9 48.2	248 20.2 19.1	354 31.3 01.5	50 44.6 21.2	Eltanin	90 42.2 N51 29.1	
	09 45 17.4	267 44.5 47.4	263 21.2 18.6	9 33.3 01.6	65 47.0 21.2	Enif	33 39.9 N 9 58.9	
	10 60 19.9	282 45.1 46.6	278 22.2 18.1	24 35.3 01.8	80 49.5 21.3	Fomalhaut	15 15.8 S29 29.8	
	11 75 22.3	297 45.7 45.8	293 23.2 17.6	39 37.3 01.9	95 52.0 21.3			
	12 90 24.8	312 46.3 N17 45.0	308 24.2 N16 17.1	54 39.3 N13 02.0	110 54.5 S10 21.3	Gacrux	171 53.0 S57 14.9	
	13 105 27.3	327 46.9 44.2	323 25.2 16.6	69 41.3 02.2	125 57.0 21.3	Gienah	175 44.9 S17 40.4	
	14 120 29.7	342 47.5 43.4	338 26.2 16.1	84 43.3 02.3	140 59.4 21.3	Hadar	148 37.5 S60 29.4	
	15 135 32.2	357 48.1 42.6	353 27.2 15.7	99 45.3 02.5	156 01.9 21.3	Hamal	327 52.8 N23 34.2	
	16 150 34.7	12 48.7 41.8	8 28.2 15.2	114 47.3 02.6	171 04.4 21.4	Kaus Aust.	83 33.8 S34 22.4	
	17 165 37.1	27 49.3 41.0	23 29.2 14.7	129 49.3 02.8	186 06.9 21.4			
	18 180 39.6	42 49.9 N17 40.2	38 30.2 N16 14.2	144 51.3 N13 02.9	201 09.4 S10 21.4	Kochab	137 18.9 N74 03.8	
	19 195 42.1	57 50.5 39.4	53 31.2 13.7	159 53.3 03.1	216 11.8 21.4	Markab	13 31.1 N15 19.7	
	20 210 44.5	72 51.1 38.6	68 32.2 13.2	174 55.3 03.2	231 14.3 21.4	Menkar	314 07.7 N 4 10.9	
	21 225 47.0	87 51.7 37.8	83 33.2 12.7	189 57.3 03.4	246 16.8 21.4	Menkent	147 58.9 S36 29.2	
	22 240 49.4	102 52.3 37.0	98 34.2 12.2	204 59.4 03.5	261 19.3 21.5	Miaplacidus	221 39.2 S69 49.0	
	23 255 51.9	117 52.9 36.2	113 35.2 11.7	220 01.4 03.7	276 21.8 21.5			
FRIDAY	23 00 270 54.4	132 53.5 N17 35.4	128 36.1 N16 11.2	235 03.4 N13 03.8	291 24.2 S10 21.5	Mirfak	308 30.5 N49 56.5	
	01 285 56.8	147 54.2 34.6	143 37.1 10.8	250 05.4 03.9	306 26.7 21.5	Nunki	75 49.0 S26 16.0	
	02 300 59.3	162 54.8 33.8	158 38.1 10.3	265 07.4 04.1	321 29.2 21.5	Peacock	53 07.3 S56 39.4	
	03 316 01.8	177 55.4 33.0	173 39.1 9.8	280 09.4 04.2	336 31.7 21.5	Pollux	243 19.2 N27 58.3	
	04 331 04.2	192 56.0 32.2	188 40.1 09.3	295 11.4 04.4	351 34.2 21.6	Procyon	244 52.5 N 5 09.9	
	05 346 06.7	207 56.6 31.4	203 41.1 08.8	310 13.4 04.5	6 36.7 21.6			
	06 1 09.2	222 57.3 N17 30.6	218 42.1 N16 08.3	325 15.4 N13 04.7	21 39.1 S10 21.6	Rasalhague	95 59.4 N12 32.6	
	07 16 11.6	237 57.9 29.8	233 43.1 07.8	340 17.4 04.8	36 41.6 21.6	Regulus	207 36.0 N11 51.3	
	08 31 14.1	252 58.5 29.0	248 44.1 07.3	355 19.4 05.0	51 44.1 21.6	Rigel	281 05.4 S 8 10.5	
	09 46 16.5	267 59.2 28.2	263 45.1 06.8	10 21.5 05.1	66 46.6 21.6	Rigel Kent.	139 41.7 S60 56.1	
	10 61 19.0	282 59.8 27.4	278 46.1 06.3	25 23.5 05.3	81 49.1 21.7	Sabik	102 03.9 S15 45.2	
	11 76 21.5	298 00.4 26.6	293 47.1 05.8	40 25.5 05.4	96 51.5 21.7			
	12 91 23.9	313 01.1 N17 25.8	308 48.1 N16 05.3	55 27.5 N13 05.6	111 54.0 S10 21.7	Schedar	349 32.6 N56 39.6	
	13 106 26.4	328 01.7 25.0	323 49.1 04.9	70 29.5 05.7	126 56.5 21.7	Shaula	96 11.7 S37 07.3	
	14 121 28.9	343 02.3 24.2	338 50.1 04.4	85 31.5 05.8	141 59.0 21.7	Sirius	258 27.7 S16 44.9	
	15 136 31.3	358 03.0 23.4	353 51.1 03.9	100 33.5 06.0	157 01.5 21.8	Spica	158 23.5 S11 17.0	
	16 151 33.8	13 03.6 22.6	8 52.1 03.4	115 35.5 06.1	172 04.0 21.8	Suhail	222 47.6 S43 31.7	
	17 166 36.3	28 04.3 21.8	23 53.1 02.9	130 37.5 06.3	187 06.4 21.8			
	18 181 38.7	43 04.9 N17 21.0	38 54.1 N16 02.4	145 39.6 N13 06.4	202 08.9 S10 21.8	Vega	80 33.7 N38 48.2	
	19 196 41.2	58 05.6 20.2	53 55.1 01.9	160 41.6 06.6	217 11.4 21.8	Zuben'ubi	136 57.2 S16 08.4	
	20 211 43.7	73 06.2 19.4	68 56.1 01.4	175 43.6 06.7	232 13.9 21.8			
	21 226 46.1	88 06.9 18.6	83 57.1 00.9	190 45.6 06.9	247 16.4 21.9			
	22 241 48.6	103 07.5 17.8	98 58.1 16 00.4	205 47.6 07.0	262 18.9 21.9	Venus	222 ^o / _° 44.1 ^h / _m 15 09	
	23 256 51.0	118 08.2 17.0	113 59.1 N15 59.9	220 49.6 07.1	277 21.4 21.9	Mars	218 17.0 15 26	
	^h / _m /					Jupiter	324 20.0 8 22	
Mer.Pass.	5 59.3	v 0.6 d 0.8	v 1.0 d 0.5	v 2.0 d 0.1	v 2.5 d 0.0	Saturn	20 29.5 4 38	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise															
	GHA		Dec	d	HP	Naut.	Civil	21		22	23		24															
	h	m																										
WEDNESDAY	00	179	34.9	N23	26.2	144	32.1	11.4	N24	53.1	6.7	54.3	N	72							05	37	08	17				
	01	194	34.8		26.2	159	02.5	11.5	24	46.4	6.8	54.3	N	70									06	27	08	37		
	02	209	34.7		26.2	173	33.0	11.5	24	39.6	7.0	54.3	68								04	32	06	58	08	52		
	03	224	34.5		26.3	188	03.5	11.6	24	32.6	7.1	54.3	66								05	24	07	21	09	04		
	04	239	34.4		26.3	202	34.1	11.7	24	25.5	7.1	54.3	64	////	////	01	31	03	58	05	56	07	39	09	15			
	05	254	34.3		26.3	217	04.8	11.8	24	18.4	7.3	54.3	62	////	////	02	09	04	39	06	19	07	54	09	23			
	06	269	34.1	N23	26.3	231	35.6	11.8	N24	11.1	7.4	54.2	60	////	00	49	02	36	05	08	06	38	08	06	09	31		
	07	284	34.0		26.3	246	06.4	11.9	24	03.7	7.5	54.2	N	58	////	01	41	02	56	05	29	06	53	08	16	09	37	
	08	299	33.8		26.3	260	37.3	12.0	23	56.2	7.6	54.2	56	////	02	11	03	13	05	47	07	06	08	25	09	43		
	09	314	33.7		26.3	260	37.3	12.0	23	56.2	7.6	54.2	54	00	45	02	33	03	28	06	02	07	18	08	33	09	48	
	10	329	33.6		26.3	275	08.3	12.1	23	48.6	7.7	54.2	52	01	32	02	51	03	40	06	15	07	28	08	41	09	53	
	11	344	33.4		26.3	289	39.4	12.1	23	40.9	7.8	54.2	50	02	00	03	06	03	51	06	26	07	37	08	47	09	57	
	12	359	33.3	N23	26.3	304	10.5	12.2	23	33.1	7.9	54.2	45	02	46	03	36	04	13	06	50	07	55	09	01	10	05	
	13	14	33.2		26.3	318	41.7	12.3	N23	25.2	8.0	54.2	N	40	03	17	03	59	04	31	07	08	08	11	09	12	10	13
	14	29	33.0		26.3	333	13.0	12.3	23	17.2	8.1	54.2	35	03	40	04	17	04	47	07	24	08	23	09	22	10	19	
	15	44	32.9		26.3	347	44.3	12.4	23	09.1	8.2	54.2	30	03	59	04	32	05	00	07	38	08	35	09	30	10	25	
	16	59	32.8		26.3	2	15.7	12.5	23	00.9	8.4	54.2	20	04	28	04	57	05	22	08	01	08	54	09	45	10	34	
	17	74	32.6		26.3	16	47.2	12.6	22	52.5	8.4	54.2	N	10	04	51	05	18	05	41	08	21	09	10	09	57	10	43
	18	89	32.5	N23	26.3	31	18.8	12.6	22	44.1	8.5	54.2	0	05	10	05	36	05	58	08	39	09	26	10	09	10	51	
	19	104	32.3		26.3	45	50.4	12.7	N22	35.6	8.6	54.2	S	10	05	27	05	53	06	16	08	58	09	41	10	21	10	58
	20	119	32.2		26.3	60	22.1	12.8	22	27.0	8.6	54.2	20	05	43	06	10	06	34	09	17	09	57	10	33	11	07	
	21	134	32.1		26.3	74	53.9	12.9	22	18.4	8.8	54.1	30	05	59	06	29	06	56	09	40	10	16	10	47	11	16	
	22	149	31.9		26.3	89	25.8	12.9	22	09.6	8.9	54.1	35	06	08	06	40	07	08	09	53	10	27	10	56	11	22	
	23	164	31.8		26.3	103	57.7	13.0	22	00.7	9.0	54.1	40	06	18	06	52	07	22	10	08	10	39	11	05	11	28	
	THURSDAY	00	179	31.7	N23	26.3	133	01.8	13.1	N21	42.7	9.2	54.1	45	06	28	07	05	07	39	10	27	10	54	11	16	11	35
01		194	31.5		26.3	147	33.9	13.2	21	33.5	9.2	54.1	S	50	06	40	07	21	08	00	10	49	11	11	11	29	11	43
02		209	31.4		26.3	162	06.1	13.3	21	24.3	9.4	54.1	52	06	45	07	29	08	10	11	00	11	20	11	35	11	47	
03		224	31.2		26.3	176	38.4	13.4	21	14.9	9.4	54.1	54	06	51	07	37	08	21	11	12	11	29	11	42	11	51	
04		239	31.1		26.2	191	10.8	13.4	21	05.5	9.5	54.1	56	06	57	07	46	08	34	11	26	11	39	11	49	11	56	
05		254	31.0		26.2	205	43.2	13.5	20	56.0	9.6	54.1	58	07	04	07	56	08	48	11	42	11	51	11	57	12	01	
06		269	30.8	N23	26.2	220	15.7	13.6	N20	46.4	9.6	54.1	S	60	07	11	08	08	09	06	12	01	12	05	12	07	12	07
07		284	30.7		26.2	234	48.3	13.6	20	36.8	9.8	54.1	Lat.		Sunset		Twilight		Moonset									
08		299	30.6		26.2	249	20.9	13.7	20	27.0	9.8	54.1					Civil		Naut.		21		22		23		24	
09		314	30.4		26.2	263	53.6	13.8	20	17.2	10.0	54.1																
10		329	30.3		26.2	278	26.4	13.8	20	07.2	10.0	54.1																
11		344	30.2		26.2	292	59.2	13.9	19	57.2	10.0	54.1																
12		359	30.0	N23	26.1	307	32.1	14.0	N19	47.2	10.2	54.1	N	72														
13		14	29.9		26.1	322	05.1	14.1	19	37.0	10.2	54.1	N	70														
14		29	29.7		26.1	336	38.2	14.1	19	26.8	10.4	54.1	68															
15		44	29.6		26.1	351	11.3	14.1	19	16.4	10.4	54.1	66															
16		59	29.5		26.1	5	44.4	14.3	19	06.0	10.4	54.1	62	22	33	////	////	////	////	01	05	00	45	00	33	00	24	
17		74	29.3		26.1	20	17.7	14.3	18	55.6	10.6	54.1	64	21	54	////	////	////	////	00	23	00	21	00	17	00	14	
18		89	29.2	N23	26.0	34	51.0	14.3	N18	45.0	10.6	54.1	60	21	28	23	15	////	////	24	01	00	01	00	04	00	05	
19		104	29.1		26.0	49	24.3	14.5	18	34.4	10.7	54.1	N	58	21	07	22	23	////	////	23	45	23	53	23	58	24	01
20		119	28.9		26.0	63	57.8	14.5	18	23.7	10.8	54.1	56	20	51	21	53	////	////	23	31	23	43	23	51	23	58	
21		134	28.8		26.0	83	57.8	14.5	18	23.7	10.8	54.1	54	20	36	21	31	23	19	23	20	23	34	23	45	23	54	
22		149	28.7		26.0	78	31.3	14.5	18	12.9	10.8	54.1	52	20	24	21	13	22	31	23	09	23	26	23	40	23	51	
23		164	28.5		25.9	93	04.8	14.6	18	02.1	10.9	54.1	50	20	13	20	58	22	03	23	00	23	19	23	35	23	48	
FRIDAY		00	179	28.4	N23	25.9	122	12.1	14.7	N17	40.2	11.1	54.1	45	19	51	20	28	21	18	22	40	23	04	23	24	23	42
	01	194	28.2		25.9	136	45.8	14.8	17	29.1	11.1	54.1	N	40	19	32	20	05	20	47	22	23	22	52	23	16	23	37
	02	209	28.1		25.9	151	19.6	14.9	17	18.0	11.2	54.1	35	19	17	19	47	20	24	22	10	22	41	23	08	23	33	
	03	224	28.0		25.8	165	53.5	14.9	17	06.8	11.2	54.1	30	19	04	19	32	20	05	21	58	22	31	23	01	23	29	
	04	239	27.8		25.8	180	27.4	14.9	16	55.6	11.3	54.1	20	18	42	19	07	19	36	21	37	22	15	22	49	23	22	
	05	254	27.7		25.8	195	01.3	15.1	16	44.3	11.4	54.1	N	10	18	23	18	46	19	13	21	19	22	00	22	39	23	16
	06	269	27.6	N23	25.8	209	35.4	15.0	N16	32.9	11.5	54.1	0	18	06	18	28	18	54	21	02	21	47	22	29	23	10	
	07	284	27.4		25.7	224	09.4	15.2	16	21.4	11.5	54.1	S	10	17	48	18	11	18	37	20	45	21	33	22	19	23	04
	08	299	27.3		25.7	238	43.6	15.2	16	09.9	11.6	54.1	20	17	30	17	54	18	21	20	27	21	19	22	09	22	58	
	09	314	27.2		25.7	253	17.8	15.2	15	58.3	11.6	54.1	303															

UT	ARIES		VENUS -4.6			MARS +1.7		JUPITER -2.2			SATURN +0.7		STARS		
	GHA		GHA	Dec		GHA	Dec	GHA	Dec		GHA	Dec	Name	SHA	Dec
SATURDAY	d h														
	24 00	271 53.5	133 08.9	N17 16.2		129 00.1	N15 59.4	235 51.6	N13 07.3		292 23.8	S10 21.9	Acamar	315 13.0	S40 12.5
	01	286 56.0	148 09.5	15.4		144 01.1	58.9	250 53.6	07.4		307 26.3	21.9	Achernar	335 21.4	S57 06.8
	02	301 58.4	163 10.2	14.6		159 02.1	58.4	265 55.6	07.6		322 28.8	22.0	Acrux	173 01.5	S63 14.0
	03	317 00.9	178 10.8	.. 13.8		174 03.1	.. 57.9	280 57.7	.. 07.7		337 31.3	.. 22.0	Adhara	255 07.3	S29 00.2
	04	332 03.4	193 11.5	13.0		189 04.1	57.4	295 59.7	07.9		352 33.8	22.0	Aldebaran	290 41.4	N16 33.3
	05	347 05.8	208 12.2	12.2		204 05.1	56.9	311 01.7	08.0		7 36.3	22.0			
	06	2 08.3	223 12.8	N17 11.4		219 06.1	N15 56.4	326 03.7	N13 08.2		22 38.8	S10 22.0	Alioth	166 14.0	N55 50.3
	07	17 10.8	238 13.5	10.6		234 07.1	55.9	341 05.7	08.3		37 41.2	22.0	Alkaid	152 52.8	N49 12.0
	08	32 13.2	253 14.2	09.8		249 08.1	55.5	356 07.7	08.4		52 43.7	22.1	Alnair	27 34.3	S46 50.7
	09	47 15.7	268 14.9	.. 09.0		264 09.1	.. 55.0	11 09.7	.. 08.6		67 46.2	.. 22.1	Alnilam	275 39.4	S 1 11.2
	10	62 18.2	283 15.6	08.1		279 10.1	54.5	26 11.8	08.7		82 48.7	22.1	Alphard	217 49.2	S 8 45.6
	11	77 20.6	298 16.2	07.3		294 11.1	54.0	41 13.8	08.9		97 51.2	22.1			
	12	92 23.1	313 16.9	N17 06.5		309 12.1	N15 53.5	56 15.8	N13 09.0		112 53.7	S10 22.1	Alphecca	126 04.5	N26 38.3
	13	107 25.5	328 17.6	05.7		324 13.1	53.0	71 17.8	09.2		127 56.2	22.2	Alpheratz	357 36.1	N29 13.0
	14	122 28.0	343 18.3	04.9		339 14.1	52.5	86 19.8	09.3		142 58.6	22.2	Altair	62 00.9	N 8 55.8
	15	137 30.5	358 19.0	.. 04.1		354 15.1	.. 52.0	101 21.8	.. 09.4		158 01.1	.. 22.2	Ankaa	353 08.4	S42 10.5
	16	152 32.9	13 19.7	03.3		9 16.1	51.5	116 23.8	09.6		173 03.6	22.2	Antares	112 17.1	S26 29.1
	17	167 35.4	28 20.4	02.5		24 17.1	51.0	131 25.9	09.7		188 06.1	22.2			
	18	182 37.9	43 21.1	N17 01.7		39 18.1	N15 50.5	146 27.9	N13 09.9		203 08.6	S10 22.3	Arcturus	145 48.9	N19 03.7
	19	197 40.3	58 21.7	00.9		54 19.1	50.0	161 29.9	10.0		218 11.1	22.3	Atria	107 11.9	S69 04.2
	20	212 42.8	73 22.4	17 00.1		69 20.1	49.5	176 31.9	10.2		233 13.6	22.3	Avior	234 15.8	S59 35.2
	21	227 45.3	88 23.1	16 59.3		84 21.1	.. 49.0	191 33.9	.. 10.3		248 16.1	.. 22.3	Bellatrix	278 24.6	N 6 22.3
	22	242 47.7	103 23.9	58.5		99 22.1	48.5	206 35.9	10.4		263 18.5	22.3	Betelgeuse	270 53.8	N 7 24.7
	23	257 50.2	118 24.6	57.7		114 23.1	48.0	221 37.9	10.6		278 21.0	22.4			
SUNDAY	25 00	272 52.6	133 25.3	N16 56.9		129 24.1	N15 47.5	236 40.0	N13 10.7		293 23.5	S10 22.4	Canopus	263 53.5	S52 42.4
	01	287 55.1	148 26.0	56.0		144 25.1	47.0	251 42.0	10.9		308 26.0	22.4	Capella	280 24.3	N46 01.2
	02	302 57.6	163 26.7	55.2		159 26.1	46.5	266 44.0	11.0		323 28.5	22.4	Deneb	49 26.3	N45 21.6
	03	318 00.0	178 27.4	.. 54.4		174 27.1	.. 46.0	281 46.0	.. 11.2		338 31.0	.. 22.4	Denebola	182 26.3	N14 26.6
	04	333 02.5	193 28.1	53.6		189 28.1	45.5	296 48.0	11.3		353 33.5	22.4	Diphda	348 48.6	S17 51.4
	05	348 05.0	208 28.8	52.8		204 29.1	45.0	311 50.0	11.4		8 36.0	22.5			
	06	3 07.4	223 29.5	N16 52.0		219 30.1	N15 44.5	326 52.1	N13 11.6		23 38.5	S10 22.5	Dubhe	193 42.8	N61 37.8
	07	18 09.9	238 30.3	51.2		234 31.1	44.0	341 54.1	11.7		38 41.0	22.5	Elnath	278 03.9	N28 37.6
	08	33 12.4	253 31.0	50.4		249 32.1	43.5	356 56.1	11.9		53 43.4	22.5	Eltanin	90 42.2	N51 29.1
	09	48 14.8	268 31.7	.. 49.6		264 33.1	.. 43.0	11 58.1	.. 12.0		68 45.9	.. 22.6	Enif	33 39.8	N 9 58.9
	10	63 17.3	283 32.4	48.8		279 34.1	42.5	27 00.1	12.2		83 48.4	22.6	Fomalhaut	15 15.8	S29 29.8
	11	78 19.8	298 33.2	48.0		294 35.1	42.0	42 02.1	12.3		98 50.9	22.6			
	12	93 22.2	313 33.9	N16 47.1		309 36.1	N15 41.5	57 04.2	N13 12.4		113 53.4	S10 22.6	Gacrux	171 53.0	S57 14.9
	13	108 24.7	328 34.6	46.3		324 37.1	41.0	72 06.2	12.6		128 55.9	22.6	Gienah	175 44.9	S17 40.4
	14	123 27.1	343 35.4	45.5		339 38.1	40.5	87 08.2	12.7		143 58.4	22.7	Hadar	148 37.5	S60 29.4
	15	138 29.6	358 36.1	.. 44.7		354 39.1	.. 40.0	102 10.2	.. 12.9		159 00.9	.. 22.7	Hamal	327 52.8	N23 34.2
	16	153 32.1	13 36.8	43.9		9 40.1	39.5	117 12.2	13.0		174 03.4	22.7	Kaus Aust.	83 33.8	S34 22.4
	17	168 34.5	28 37.6	43.1		24 41.1	39.0	132 14.3	13.1		189 05.9	22.7			
	18	183 37.0	43 38.3	N16 42.3		39 42.1	N15 38.5	147 16.3	N13 13.3		204 08.4	S10 22.7	Kochab	137 19.0	N74 03.8
	19	198 39.5	58 39.1	41.5		54 43.1	38.0	162 18.3	13.4		219 10.8	22.8	Markab	13 31.1	N15 19.8
	20	213 41.9	73 39.8	40.7		69 44.1	37.5	177 20.3	13.6		234 13.3	22.8	Menkar	314 07.7	N 4 10.9
	21	228 44.4	88 40.5	.. 39.9		84 45.1	.. 37.0	192 22.3	.. 13.7		249 15.8	.. 22.8	Menkent	147 58.9	S36 29.2
	22	243 46.9	103 41.3	39.0		99 46.1	36.5	207 24.4	13.9		264 18.3	22.8	Miaplacidus	221 39.2	S69 48.9
	23	258 49.3	118 42.0	38.2		114 47.1	36.0	222 26.4	14.0		279 20.8	22.8			
MONDAY	26 00	273 51.8	133 42.8	N16 37.4		129 48.1	N15 35.5	237 28.4	N13 14.1		294 23.3	S10 22.9	Mirfak	308 30.5	N49 56.5
	01	288 54.2	148 43.6	36.6		144 49.1	35.0	252 30.4	14.3		309 25.8	22.9	Nunki	75 49.0	S26 16.0
	02	303 56.7	163 44.3	35.8		159 50.2	34.5	267 32.4	14.4		324 28.3	22.9	Peacock	53 07.2	S56 39.4
	03	318 59.2	178 45.1	.. 35.0		174 51.2	.. 34.0	282 34.5	.. 14.6		339 30.8	.. 22.9	Pollux	243 19.2	N27 58.3
	04	334 01.6	193 45.8	34.2		189 52.2	33.5	297 36.5	14.7		354 33.3	22.9	Procyon	244 52.5	N 5 09.9
	05	349 04.1	208 46.6	33.4		204 53.2	32.9	312 38.5	14.8		9 35.8	23.0			
	06	4 06.6	223 47.4	N16 32.6		219 54.2	N15 32.4	327 40.5	N13 15.0		24 38.3	S10 23.0	Rasalhague	95 59.4	N12 32.6
	07	19 09.0	238 48.1	31.7		234 55.2	31.9	342 42.5	15.1		39 40.8	23.0	Regulus	207 36.0	N11 51.3
	08	34 11.5	253 48.9	30.9		249 56.2	31.4	357 44.6	15.3		54 43.3	23.0	Rigel	281 05.4	S 8 10.4
	09	49 14.0	268 49.7	.. 30.1		264 57.2	.. 30.9	12 46.6	.. 15.4		69 45.7	.. 23.1	Rigel Kent.	139 41.7	S60 56.1
	10	64 16.4	283 50.4	29.3		279 58.2	30.4	27 48.6	15.5		84 48.2	23.1	Sabik	102 03.9	S15 45.2
	11	79 18.9	298 51.2	28.5		294 59.2	29.9	42 50.6	15.7		99 50.7	23.1			
	12	94 21.4	313 52.0	N16 27.7		310 00.2	N15 29.4	57 52.6	N13 15.8		114 53.2	S10 23.1	Schedar	349 32.6	N56 39.6
	13	109 23.8	328 52.8	26.9		325 01.2	28.9	72 54.7	16.0		129 55.7	23.1	Shaula	96 11.7	S37 07.3
	14	124 26.3	343 53.6	26.1		340 02.2	28.4	87 56.7	16.1		144 58.2	23.2	Sirius	258 27.7	S16 44.9
	15	139 28.7	358 54.3	.. 25.2		355 03.2	.. 27.9	102 58.7	.. 16.2		160 00.7	.. 23.2	Spica	158 23.6	S11 17.0
	16	154 31.2	13 55.1	24.4		10 04.2	27.4	118 00.7	16.4		175 03.2	23.2	Suhail	222 47.6	S43 31.7
	17	169 33.7	28 55.9	23.6		25 05.2	26.9	133 02.7	16.5		190 05.7	23.2			
	18	184 36.1	43 56.7	N16 22.8		40 06.2	N15 26.4	148 04.8	N13 16.7		205 08.2	S10 23.3	Vega	80 33.7	N38 48.3
	19	199 38.6	58 57.5	22.0		55 07.2	25.9	163 06.8	16.8		220 10.7	23.3	Zuben'ubi	136 57.2	S16 08.4
	20	214 41.1	73 58.3	21.2		70 08.2	25.4	178 08.8	16.9		235 13.2	23.3			
	21	229 43.5	88 59.1	.. 20.4		85 09.2	.. 24.9	193 10.8	.. 17.1		250 15.7	.. 23.3			
	22	244 46.0	103 59.9	19.6		100 10.2	24.4	208 12.9	17.2		265 18.2	23.3	Venus	220 32.6	h m
	23	259 48.5	119 00.7	18.7		115 11.2	23.9	223 14.9	17.4		280 20.7	23.4	Mars	216 31.5	15 21
													Jupiter	323 47.3	8 12
													Saturn	20 30.9	4 26
Mer. Pass. 5 47.5			v 0.7	d 0.8		v 1.0	d 0.5	v 2.0	d 0.1		v 2.5	d 0.0			

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	24	25	26	27
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	
SATURDAY	24 00	179 25.1	N23 25.1	111 56.4	15.9	N12 57.6	12.5	54.2	N 72	00 00	00 00	00 00	08 17	10 22	12 21	14 24		
	01	194 25.0	25.1	126 31.3	16.0	12 45.1	12.5	54.2	N 70	00 00	00 00	00 00	08 37	10 30	12 20	14 13		
	02	209 24.9	25.1	141 06.3	16.0	12 32.6	12.6	54.2	68	00 00	00 00	00 00	08 52	10 37	12 19	14 05		
	03	224 24.7	25.0	155 41.3	16.1	12 20.0	12.6	54.2	66	00 00	00 00	00 00	09 04	10 42	12 18	13 57		
	04	239 24.6	25.0	170 16.4	16.1	12 07.4	12.7	54.2	64	00 00	00 00	01 33	09 15	10 46	12 17	13 51		
	05	254 24.5	24.9	184 51.5	16.1	11 54.7	12.7	54.2	62	00 00	00 00	02 11	09 23	10 50	12 17	13 46		
	06	269 24.3	N23 24.9	199 26.6	16.1	N11 42.0	12.8	54.3	60	00 00	00 52	02 37	09 31	10 53	12 16	13 42		
	07	284 24.2	24.8	214 01.7	16.2	11 29.2	12.8	54.3	N 58	00 00	01 42	02 58	09 37	10 56	12 16	13 38		
	08	299 24.1	24.8	228 36.9	16.2	11 16.4	12.9	54.3	56	00 00	02 12	03 14	09 43	10 59	12 16	13 34		
	09	314 23.9	24.7	243 12.1	16.3	11 03.5	12.9	54.3	54	00 47	02 34	03 29	09 48	11 01	12 15	13 31		
SUNDAY	10 00	329 23.8	24.7	257 47.4	16.2	10 50.6	13.0	54.3	52	01 34	02 52	03 41	09 52	11 03	12 15	13 28		
	11 00	344 23.7	24.6	272 22.6	16.4	10 37.6	13.0	54.3	50	02 02	03 07	03 52	09 57	11 05	12 15	13 26		
	12 00	359 23.5	N23 24.6	286 58.0	16.3	N10 24.6	13.0	54.3	45	02 47	03 37	04 14	10 05	11 09	12 14	13 20		
	13 00	14 23.4	24.5	301 33.3	16.4	10 11.6	13.1	54.3	N 40	03 18	03 59	04 32	10 13	11 13	12 13	13 16		
	14 00	29 23.2	24.5	316 08.7	16.3	9 58.5	13.1	54.3	35	03 41	04 18	04 47	10 19	11 16	12 13	13 12		
	15 00	44 23.1	24.4	330 44.0	16.5	9 45.4	13.2	54.3	30	04 00	04 33	05 00	10 25	11 19	12 13	13 08		
	16 00	59 23.0	24.4	345 19.5	16.4	9 32.2	13.2	54.4	20	04 29	04 58	05 22	10 34	11 23	12 12	13 02		
	17 00	74 22.8	24.3	359 54.9	16.5	9 19.0	13.3	54.4	N 10	04 51	05 18	05 41	10 43	11 27	12 11	12 57		
	18 00	89 22.7	N23 24.3	14 30.4	16.4	N 9 05.7	13.3	54.4	0	05 10	05 36	05 59	10 51	11 31	12 11	12 52		
	19 00	104 22.6	24.2	29 05.8	16.5	8 52.4	13.3	54.4	S 10	05 27	05 54	06 16	10 58	11 35	12 11	12 48		
MONDAY	20 00	119 22.4	24.2	43 41.3	16.6	8 39.1	13.3	54.4	20	05 43	06 11	06 35	11 07	11 39	12 10	12 42		
	21 00	134 22.3	24.1	58 16.9	16.5	8 25.8	13.4	54.4	30	06 00	06 30	06 56	11 16	11 43	12 09	12 37		
	22 00	149 22.2	24.1	72 52.4	16.6	8 12.4	13.5	54.4	35	06 09	06 40	07 08	11 22	11 46	12 09	12 34		
	23 00	164 22.0	24.0	87 28.0	16.5	7 58.9	13.5	54.5	40	06 18	06 52	07 23	11 28	11 48	12 09	12 30		
	24 00	179 21.9	N23 24.0	102 03.5	16.6	N 7 45.4	13.5	54.5	45	06 28	07 06	07 39	11 35	11 52	12 08	12 26		
	01 00	194 21.8	23.9	116 39.1	16.6	N 7 31.9	13.5	54.5	S 50	06 40	07 22	08 00	11 43	11 56	12 08	12 21		
	02 00	209 21.6	23.8	131 14.7	16.7	7 18.4	13.6	54.5	52	06 45	07 29	08 10	11 47	11 58	12 08	12 18		
	03 00	224 21.5	23.8	145 50.4	16.6	7 04.8	13.6	54.5	54	06 51	07 37	08 21	11 51	12 00	12 08	12 16		
	04 00	239 21.4	23.7	160 26.0	16.6	6 51.2	13.6	54.5	56	06 57	07 46	08 34	11 56	12 02	12 07	12 13		
	05 00	254 21.2	23.7	175 01.6	16.7	6 37.6	13.7	54.5	58	07 04	07 57	08 49	12 01	12 04	12 07	12 10		
TUESDAY	06 00	269 21.1	N23 23.6	189 37.3	16.7	N 6 23.9	13.7	54.6	S 60	07 12	08 08	09 06	12 07	12 07	12 07	12 07		
	07 00	284 21.0	23.5	204 13.0	16.6	6 10.2	13.7	54.6		Lat.	Sunset	Twilight		Moonset				
	08 00	299 20.8	23.5	218 48.6	16.7	5 56.5	13.8	54.6				Civil	Naut.	24	25	26	27	
	09 00	314 20.7	23.4	233 24.3	16.7	5 42.7	13.8	54.6										
	10 00	329 20.6	23.3	248 00.0	16.7	5 28.9	13.8	54.6										
	11 00	344 20.4	23.3	262 35.7	16.7	5 15.1	13.8	54.6										
	12 00	359 20.3	N23 23.2	277 11.4	16.7	N 5 01.3	13.9	54.7	N 72	00 00	00 00	00 00	01 28	00 48	(00 23)	23 11		
	13 00	14 20.2	23.1	291 47.1	16.7	4 47.4	13.9	54.7	N 70	00 00	00 00	00 00	01 06	00 38	(00 23)	23 24		
	14 00	29 20.0	23.1	306 22.8	16.6	4 33.5	13.9	54.7	68	00 00	00 00	00 00	00 49	00 29	(00 23)	23 35		
	15 00	44 19.9	23.0	320 58.4	16.7	4 19.6	14.0	54.7	66	00 00	00 00	00 00	00 35	00 22	(00 23)	23 44		
WEDNESDAY	16 00	59 19.8	22.9	335 34.1	16.7	4 05.6	14.0	54.7	64	22 32	00 00	00 00	00 24	00 16	00 08	(00 23)	23 53	
	17 00	74 19.6	22.9	350 09.8	16.7	3 51.6	14.0	54.8	62	21 54	00 00	00 00	00 14	00 10	00 07	(00 23)	00 01	
	18 00	89 19.5	N23 22.8	4 45.5	16.7	N 3 37.6	14.0	54.8	60	21 28	23 13	00 00	00 05	00 06	00 05	00 05	00 05	
	19 00	104 19.4	22.7	19 21.2	16.7	3 23.6	14.0	54.8	N 58	21 07	22 23	00 00	24 01	00 01	00 04	00 07		
	20 00	119 19.2	22.6	33 56.9	16.6	3 09.6	14.1	54.8	56	20 51	21 53	00 00	23 58	24 03	00 03	00 09		
	21 00	134 19.1	22.6	48 32.5	16.7	2 55.5	14.1	54.8	54	20 37	21 31	23 17	23 54	24 02	00 02	00 10		
	22 00	149 19.0	22.5	63 08.2	16.6	2 41.4	14.1	54.9	52	20 24	21 13	22 31	23 51	24 01	00 01	00 12		
	23 00	164 18.8	22.4	77 43.8	16.7	2 27.3	14.1	54.9	50	20 13	20 58	22 03	23 48	24 01	00 01	00 13		
	24 00	179 18.7	N23 22.3	92 19.5	16.6	N 2 13.2	14.1	54.9	45	19 51	20 28	21 18	23 42	23 59	24 16	00 16		
	THURSDAY	01 00	194 18.6	22.3	106 55.1	16.6	1 59.1	14.2	54.9	N 40	19 33	20 06	20 47	23 37	23 58	24 18	00 18	
02 00		209 18.4	22.2	121 30.7	16.6	1 44.9	14.2	54.9	35	19 18	19 48	20 24	23 33	23 56	24 20	00 20		
03 00		224 18.3	22.1	136 06.3	16.6	1 30.7	14.2	55.0	30	19 05	19 32	20 06	23 29	23 55	24 22	00 22		
04 00		239 18.2	22.0	150 41.9	16.6	1 16.5	14.2	55.0	20	18 43	19 07	19 37	23 22	23 53	24 25	00 25		
05 00		254 18.1	22.0	165 17.5	16.5	1 02.3	14.2	55.0	N 10	18 24	18 47	19 14	23 16	23 52	24 28	00 28		
06 00		269 17.9	N23 21.9	179 53.0	16.5	N 0 48.1	14.3	55.0	0	18 06	18 29	18 55	23 10	23 50	24 31	00 31		
07 00		284 17.8	21.8	194 28.5	16.5	0 33.8	14.2	55.1	S 10	17 49	18 12	18 38	23 04	23 48	24 33	00 33		
08 00		299 17.7	21.7	209 04.0	16.5	0 19.6	14.3	55.1	20	17 30	17 54	18 22	22 58	23 47	24 36	00 36		
09 00		314 17.5	21.6	223 39.5	16.5	N 0 05.3	14.3	55.1	30	17 09	17 36	18 05	22 51	23 45	24 39	00 39		
10 00		329 17.4	21.5	238 15.0	16.4	S 0 09.0	14.3	55.1	35	16 57	17 25	17 57	22 47	23 43	24 41	00 41		
FRIDAY	11 00	344 17.3	21.5	252 50.4	16.4	S 0 23.3	14.3	55.2	40	16 43	17 13	17 47	22 42	23 42	24 43	00 43		
	12 00	359 17.1	N23 21.4	267 25.8	16.4	S 0 37.6	14.3	55.2	45	16 26	17 00	17 37	22 36	23 40	24 46	00 46		
	13 00	14 17.0	21.3	282 01.2	16.4	0 51.9	14.4	55.2	S 50	16 05	16 44	17 25	22 30	23 39	24 48	00 48		
	14 00	29 16.9	21.2	296 36.6	16.3	1 06.3	14.3	55.2	52	15 55	16 36	17 20	22 27	23 38	24 50	00 50		
	15 00	44 16.7	21.1	311 11.9	16.3	1 20.6	14.3	55.3	54	15 44	16 28	17 14	22 23	23 37	24 51	00 51		
	16 00	59 16.6	21.1	325 47.2	16.3	1 34.9	14.4	55.3	56	15 32	16 19	17 08	22 19	23 36	24 53	00 53		
	17 00	74 16.5	21.0	340 22.5	16.2	1 49.3	14.3	55.3	58	15 17	16 09	17 01	22 15	23 34	24 55	00 55		
	18 00	89 16.3	N23 20.9	354 57.7	16.2	S 2 03.6	14.4	55.3	S 60	14 59	15 57	16 54	22 10	23 33	24 57	00 57		
	19 00	104 16.2	20.8	9 32.9	16.2	2 18.0	14.4	55.4										
	20 00	119 16.1	20.7	24 08.1	16.1	2 32.4	14.4											

UT	ARIES		VENUS -4.6		MARS +1.7		JUPITER -2.2		SATURN +0.7		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
TUESDAY	27 00	274 50.9	134 01.5	17.9	130 12.2	23.3	238 16.9	17.5	295 23.2	23.4	Acamar	315 13.0	S40 12.5
	01	289 53.4	149 02.3	17.1	145 13.2	22.8	253 18.9	17.6	310 25.7	23.4	Achernar	335 21.3	S57 06.8
	02	304 55.9	164 03.1	16.3	160 14.2	22.3	268 21.0	17.8	325 28.2	23.4	Acrux	173 01.5	S63 14.0
	03	319 58.3	179 03.9	15.5	175 15.2	21.8	283 23.0	17.9	340 30.7	23.5	Adhara	255 07.3	S29 00.2
	04	335 00.8	194 04.7	14.7	190 16.2	21.3	298 25.0	18.1	355 33.2	23.5	Aldebaran	290 41.4	N16 33.3
	05	350 03.2	209 05.5	13.9	205 17.2	20.8	313 27.0	18.2	10 35.7	23.5			
	06	5 05.7	224 06.4	13.0	220 18.2	20.3	328 29.1	18.3	25 38.2	23.5	Alioth	166 14.0	N55 50.3
	07	20 08.2	239 07.2	12.2	235 19.2	19.8	343 31.1	18.5	40 40.7	23.6	Alkaid	152 52.8	N49 12.0
	08	35 10.6	254 08.0	11.4	250 20.2	19.3	358 33.1	18.6	55 43.2	23.6	Alnair	27 34.2	S46 50.7
	09	50 13.1	269 08.8	10.6	265 21.2	18.8	13 35.1	18.7	70 45.7	23.6	Anilam	275 39.4	S 1 11.2
	10	65 15.6	284 09.6	09.8	280 22.2	18.3	28 37.2	18.9	85 48.1	23.6	Alphard	217 49.3	S 8 45.6
	11	80 18.0	299 10.5	09.0	295 23.2	17.8	43 39.2	19.0	100 50.6	23.6			
	12	95 20.5	314 11.3	08.2	310 24.2	17.2	58 41.2	19.2	115 53.1	23.7	Alphecca	126 04.5	N26 38.3
	13	110 23.0	329 12.1	07.3	325 25.2	16.7	73 43.2	19.3	130 55.6	23.7	Alpheratz	357 36.1	N29 13.0
	14	125 25.4	344 13.0	06.5	340 26.2	16.2	88 45.3	19.4	145 58.1	23.7	Altair	62 00.9	N 8 55.8
	15	140 27.9	359 13.8	05.7	355 27.2	15.7	103 47.3	19.6	161 00.6	23.7	Ankaa	353 08.4	S42 10.5
	16	155 30.3	14 14.6	04.9	10 28.3	15.2	118 49.3	19.7	176 03.1	23.8	Antares	112 17.1	S26 29.1
	17	170 32.8	29 15.5	04.1	25 29.3	14.7	133 51.3	19.8	191 05.6	23.8			
	18	185 35.3	44 16.3	03.3	40 30.3	14.2	148 53.4	20.0	200 08.1	23.8	Arcturus	145 48.9	N19 03.8
	19	200 37.7	59 17.1	02.5	55 31.3	13.7	163 55.4	20.1	221 10.6	23.8	Atria	107 11.9	S69 04.3
	20	215 40.2	74 18.0	01.6	70 32.3	13.2	178 57.4	20.3	236 13.1	23.9	Avior	234 15.8	S59 35.1
	21	230 42.7	89 18.8	00.8	85 33.3	12.7	193 59.4	20.4	251 15.6	23.9	Bellatrix	278 24.6	N 6 22.3
	22	245 45.1	104 19.7	16 00.0	100 34.3	12.1	209 01.5	20.5	266 18.1	23.9	Betelgeuse	270 53.8	N 7 24.7
23	260 47.6	119 20.5	15 59.2	115 35.3	11.6	224 03.5	20.7	281 20.6	23.9				
WEDNESDAY	28 00	275 50.1	134 21.4	15.8	130 36.3	11.1	239 05.5	20.8	296 23.1	24.0	Canopus	263 53.5	S52 42.4
	01	290 52.5	149 22.2	57.6	145 37.3	10.6	254 07.5	21.0	311 25.6	24.0	Capella	280 24.3	N46 01.2
	02	305 55.0	164 23.1	56.8	160 38.3	10.1	269 09.6	21.1	326 28.1	24.0	Deneb	49 26.3	N45 21.7
	03	320 57.5	179 24.0	55.9	175 39.3	09.6	284 11.6	21.2	341 30.6	24.0	Denebola	182 26.3	N14 26.6
	04	335 59.9	194 24.8	55.1	190 40.3	09.1	299 13.6	21.4	356 33.1	24.0	Diphda	348 48.6	S17 51.4
	05	351 02.4	209 25.7	54.3	205 41.3	08.6	314 15.7	21.5	11 35.6	24.1			
	06	6 04.8	224 26.5	53.5	220 42.3	08.1	329 17.7	21.6	26 38.1	24.1	Dubhe	193 42.8	N61 37.8
	07	21 07.3	239 27.4	52.7	235 43.3	07.5	344 19.7	21.8	41 40.6	24.1	Elnath	278 03.9	N28 37.6
	08	36 09.8	254 28.3	51.9	250 44.3	07.0	359 21.7	21.9	56 43.1	24.1	Eltanin	90 42.2	N51 29.1
	09	51 12.2	269 29.2	51.0	265 45.3	06.5	14 23.8	22.0	71 45.6	24.1	Enif	33 39.8	N 9 58.9
	10	66 14.7	284 30.0	50.2	280 46.3	06.0	29 25.8	22.2	86 48.1	24.2	Fomalhaut	15 15.8	S29 29.8
	11	81 17.2	299 30.9	49.4	295 47.3	05.5	44 27.8	22.3	101 50.7	24.2			
	12	96 19.6	314 31.8	48.6	310 48.3	05.0	59 29.9	22.5	116 53.2	24.2	Gacrux	171 53.1	S57 14.9
	13	111 22.1	329 32.7	47.8	325 49.3	04.5	74 31.9	22.6	131 55.7	24.3	Gienah	175 44.9	S17 40.4
	14	126 24.6	344 33.6	47.0	340 50.3	04.0	89 33.9	22.7	146 58.2	24.3	Hadar	148 37.5	S60 29.4
	15	141 27.0	359 34.4	46.2	355 51.3	03.4	104 35.9	22.9	162 00.7	24.3	Hamal	327 52.8	N23 34.3
	16	156 29.5	14 35.3	45.3	10 52.3	02.9	119 38.0	23.0	177 03.2	24.3	Kaus Aust.	83 33.8	S34 22.4
	17	171 32.0	29 36.2	44.5	25 53.4	02.4	134 40.0	23.1	192 05.7	24.4			
	18	186 34.4	44 37.1	43.7	40 54.4	01.9	149 42.0	23.3	207 08.2	24.4	Kochab	137 19.0	N74 03.8
	19	201 36.9	59 38.0	42.9	55 55.4	01.4	164 44.1	23.4	222 10.7	24.4	Markab	13 31.1	N15 19.8
	20	216 39.3	74 38.9	42.1	70 56.4	00.9	179 46.1	23.5	237 13.2	24.4	Menkar	314 07.7	N 4 10.9
	21	231 41.8	89 39.8	41.3	85 57.4	15 00.4	194 48.1	23.7	252 15.7	24.5	Menkent	147 59.0	S36 29.2
	22	246 44.3	104 40.7	40.5	100 58.4	14 59.8	209 50.2	23.8	267 18.2	24.5	Miaplacidus	221 39.3	S69 48.9
23	261 46.7	119 41.6	39.6	115 59.4	59.3	224 52.2	24.0	282 20.7	24.5				
THURSDAY	29 00	276 49.2	134 42.5	15.8	131 00.4	11.4	239 54.2	21.3	297 23.2	24.5	Mirfak	308 30.5	N49 56.5
	01	291 51.7	149 43.4	38.0	146 01.4	58.3	254 56.2	24.2	312 25.7	24.6	Nunki	75 49.0	S26 16.0
	02	306 54.1	164 44.3	37.2	161 02.4	57.8	269 58.3	24.4	327 28.2	24.6	Peacock	53 07.2	S56 39.4
	03	321 56.6	179 45.2	36.4	176 03.4	57.3	285 00.3	24.5	342 30.7	24.6	Pollux	243 19.2	N27 58.3
	04	336 59.1	194 46.1	35.6	191 04.4	56.7	300 02.3	24.6	357 33.2	24.7	Procyon	244 52.5	N 5 09.9
	05	352 01.5	209 47.1	34.7	206 05.4	56.2	315 04.4	24.8	12 35.7	24.7			
	06	7 04.0	224 48.0	33.9	221 06.4	55.7	330 06.4	24.9	27 38.2	24.7	Rasalhague	95 59.4	N12 32.6
	07	22 06.4	239 48.9	33.1	236 07.4	55.2	345 08.4	25.0	42 40.7	24.7	Regulus	207 36.0	N11 51.3
	08	37 08.9	254 49.8	32.3	251 08.4	54.7	0 10.5	25.2	57 43.2	24.8	Rigel	281 05.4	S 8 10.4
	09	52 11.4	269 50.7	31.5	266 09.4	54.2	15 12.5	25.3	72 45.7	24.8	Rigil Kent.	139 41.7	S60 56.1
	10	67 13.8	284 51.7	30.7	281 10.4	53.7	30 14.5	25.4	87 48.2	24.8	Sabik	102 03.9	S15 45.2
	11	82 16.3	299 52.6	29.8	296 11.4	53.1	45 16.6	25.6	102 50.7	24.8			
	12	97 18.8	314 53.5	29.0	311 12.4	52.6	60 18.6	25.7	117 53.3	24.9	Schedar	349 32.6	N56 39.6
	13	112 21.2	329 54.5	28.2	326 13.5	52.1	75 20.6	25.8	132 55.8	24.9	Shaula	96 11.7	S37 07.3
	14	127 23.7	344 55.4	27.4	341 14.5	51.6	90 22.7	26.0	147 58.3	24.9	Sirius	258 27.7	S16 44.9
	15	142 26.2	359 56.3	26.6	356 15.5	51.1	105 24.7	26.1	163 00.8	24.9	Spica	158 23.6	N11 17.0
	16	157 28.6	14 57.3	25.8	11 16.5	50.5	120 26.7	26.3	178 03.3	25.0	Suhail	222 47.6	S43 31.7
	17	172 31.1	29 58.2	25.0	26 17.5	50.0	135 28.8	26.4	193 05.8	25.0			
	18	187 33.6	44 59.2	24.1	41 18.5	49.5	150 30.8	26.5	208 08.3	25.0	Vega	80 33.7	N38 48.3
	19	202 36.0	60 00.1	23.3	56 19.5	49.0	165 32.8	26.7	223 10.8	25.0	Zuben'ubi	136 57.2	S16 08.4
	20	217 38.5	75 01.0	22.5	71 20.5	48.5	180 34.9	26.8	238 13.3	25.1			
	21	232 40.9	90 02.0	21.7	86 21.5	48.0	195 36.9	26.9	253 15.8	25.1		SHA	Mer.Pass.
	22	247 43.4	105 03.0	20.9	101 22.5	47.4	210 38.9	27.1	268 18.3	25.1	Venus	218 31.3	h 15 02
23	262 45.9	120 03.9	20.1	116 23.5	46.9	225 41.0	27.2	283 20.8	25.2	Mars	214 46.2	15 17	
										Jupiter	323 15.5	8 03	
Mer.Pass.	5 35.7	v 0.9	d 0.8	v 1.0	d 0.5	v 2.0	d 0.1	v 2.5	d 0.0	Saturn	20 33.1	4 14	

UT	SUN				MOON							Lat.	Twilight		Sunrise	Moonrise											
	GHA		Dec		GHA		<i>v</i>	Dec	<i>d</i>	HP	Naut.		Civil	27		28	29	30									
d	h	°	'	°	'	°	'	°	'	°	'	°	h	m	h	m	h	m	h	m	h	m					
TUESDAY	27	00	179	15.6	N23	20.3	82	28.3	16.0	S	3	29.9	14.4	55.5	N	72				14	24	16	47				
	01	194	15.4		20.2	97	03.3	15.9	3	44.3	14.4	55.5	N	70				14	13	16	20	19	16				
	02	209	15.3		20.2	111	38.2	15.9	3	58.7	14.4	55.5	66				14	05	16	00	18	21					
	03	224	15.2		20.1	126	13.1	15.8	4	13.1	14.4	55.6	64	////	////	01 36	13	57	15	45	17	48	20	41			
	04	239	15.0		20.0	140	47.9	15.8	4	27.5	14.3	55.6	62	////	////	02 13	13	51	15	32	17	24	19	36			
	05	254	14.9		19.9	155	22.7	15.7	4	41.8	14.4	55.6	60	////	00 56	02 39	13	46	15	21	17	05	19	01			
	06	269	14.8	N23	19.8	169	57.4	15.7	S	4	56.2	14.4	55.7	58	////	01 45	02 59	13	42	15	12	16	50	18	36		
	07	284	14.6		19.7	184	32.1	15.6	5	10.6	14.4	55.7	56	////	02 14	03 16	13	38	15	04	16	37	18	16			
	08	299	14.5		19.6	199	06.7	15.6	5	25.0	14.3	55.7	54	00 52	02 36	03 30	13	34	14	57	16	26	17	59			
	09	314	14.4		19.5	213	41.3	15.5	5	39.3	14.4	55.8	52	01 36	02 54	03 42	13	31	14	51	16	16	17	49			
	10	329	14.3		19.4	228	15.8	15.5	5	53.7	14.4	55.8	50	02 04	03 09	03 53	13	28	14	45	16	07	17	33			
	11	344	14.1		19.3	242	50.3	15.4	6	08.1	14.3	55.8	48	02 49	03 38	04 15	13	26	14	40	16	00	17	23			
	12	359	14.0	N23	19.2	257	24.7	15.4	S	6	22.4	14.3	55.8	N	40	03 19	04 01	04 33	13	20	14	30	15	43	17	00	
	13	14	13.9		19.1	271	59.1	15.2	6	36.7	14.4	55.9	35	03 42	04 19	04 48	13	16	14	21	15	30	16	43			
	14	29	13.7		19.0	286	33.3	15.3	6	51.1	14.3	55.9	30	04 01	04 34	05 01	13	12	14	13	15	18	16	28			
	15	44	13.6		18.9	301	07.6	15.1	7	05.4	14.3	55.9	20	04 30	04 59	05 23	13	08	14	07	15	09	16	15			
	16	59	13.5		18.8	315	41.7	15.2	7	19.7	14.3	56.0	N	10	04 52	05 19	05 42	13	05	14	55	14	52	15	53		
	17	74	13.4		18.7	330	15.9	15.0	7	34.0	14.3	56.0	0	05 11	05 37	06 00	12	52	13	45	14	37	15	34			
	18	89	13.2	N23	18.6	344	49.9	15.0	S	7	48.3	14.2	56.0	S	10	05 28	05 54	06 17	12	50	13	36	14	24	15	17	
	19	104	13.1		18.5	359	23.9	14.9	8	02.5	14.3	56.1	20	05 44	06 11	06 35	12	48	13	27	14	10	14	59			
	20	119	13.0		18.3	13	57.8	14.8	8	16.8	14.2	56.1	30	06 00	06 30	06 56	12	42	13	17	13	56	14	41			
	21	134	12.8		18.2	28	31.6	14.8	8	31.0	14.2	56.1	35	06 09	06 41	07 09	12	37	13	06	13	40	14	20			
	22	149	12.7		18.1	43	05.4	14.7	8	45.2	14.2	56.2	40	06 18	06 52	07 23	12	35	13	00	13	31	14	07			
23	164	12.6		18.0	57	39.1	14.6	8	59.4	14.2	56.2	45	06 29	07 06	07 40	12	30	12	53	13	20	13	53				
WEDNESDAY	28	00	179	12.4	N23	17.9	72	12.7	14.6	S	9	13.6	14.1	56.2	S	50	06 40	07 22	08 00	12	21	12	35	12	53	13	16
	01	194	12.3		17.8	86	46.3	14.4	9	27.7	14.2	56.3	52	06 45	07 29	08 10	12	18	12	30	12	46	13	07			
	02	209	12.2		17.7	101	19.7	14.4	9	41.9	14.1	56.3	54	06 51	07 37	08 21	12	16	12	26	12	38	12	56			
	03	224	12.1		17.6	115	53.1	14.3	9	56.0	14.0	56.3	56	06 57	07 46	08 33	12	14	12	20	12	29	12	44			
	04	239	11.9		17.5	130	26.4	14.3	10	10.0	14.1	56.4	58	07 04	07 56	08 48	12	13	12	14	12	20	12	30			
	05	254	11.8		17.4	144	59.7	14.1	10	24.1	14.0	56.4	S	60	07 11	08 08	09 05	12	11	12	07	12	09	12	13		
	06	269	11.7	N23	17.2	159	32.8	14.1	S10	38.1	14.0	56.4															
	07	284	11.6		17.1	174	05.9	14.0	10	52.1	14.0	56.5	Lat.	Sunset	Twilight		Moonset										
	08	299	11.4		17.0	188	38.9	13.9	11	06.1	14.0	56.5			Civil	Naut.	27	28	29	30							
	09	314	11.3		16.9	203	11.8	13.8	11	20.1	13.9	56.5															
	10	329	11.2		16.8	217	44.6	13.8	11	34.0	13.8	56.6															
	11	344	11.0		16.7	232	17.4	13.6	11	47.8	13.9	56.6															
	12	359	10.9	N23	16.5	246	50.0	13.5	S12	01.7	13.8	56.6	N	72				23	11	22	21						
	13	14	10.8		16.4	261	22.5	13.5	12	15.5	13.8	56.7	N	70				23	24	22	50	21	35				
	14	29	10.7		16.3	275	55.0	13.4	12	29.3	13.7	56.7	68				23	35	23	12	22	32					
	15	44	10.5		16.2	290	27.4	13.2	12	43.0	13.7	56.8	66				23	44	23	29	23	06	22	05			
	16	59	10.4		16.1	304	59.6	13.2	12	56.7	13.7	56.8	64	22 29	////	////	(23 09)	23	43	23	31	23	12				
	17	74	10.3		15.9	319	31.8	13.1	13	10.4	13.6	56.8	62	21 53	////	////	(23 03)	23	55	23	51	23	47				
	18	89	10.1	N23	15.8	334	03.9	13.0	S13	24.0	13.6	56.9	60	21 27	23 09	////	00	05	00	05	00	05	00	08			
	19	104	10.0		15.7	348	35.9	12.9	13	37.6	13.5	56.9	N	58	21 07	22 21	////	00	07	00	10	00	14	00	21		
	20	119	09.9		15.6	3	07.8	12.7	13	51.1	13.5	56.9	56	20 50	21 52	////	00	09	00	15	00	22	00	33			
	21	134	09.8		15.5	17	39.5	12.7	14	04.6	13.4	57.0	54	20 36	21 30	23 13	00	10	00	19	00	29	00	44			
	22	149	09.6		15.3	32	11.2	12.6	14	18.0	13.4	57.0	52	20 24	21 13	22 30	00	12	00	23	00	36	00	53			
23	164	09.5		15.2	46	42.8	12.5	14	31.4	13.4	57.0	50	20 13	20 58	22 03	00	13	00	26	00	42	01	01				
THURSDAY	29	00	179	09.4	N23	15.1	61	14.3	12.3	S14	44.8	13.2	57.1	N	40	19 33	20 06	20 47	00	18	00	40	01	04	01	34	
	01	194	09.3		15.0	75	45.6	12.3	14	58.0	13.3	57.1	35	19 18	19 48	20 24	00	20	00	45	01	13	01	47			
	02	209	09.1		14.8	90	16.9	12.1	15	11.3	13.2	57.2	30	19 05	19 33	20 06	00	22	00	50	01	21	01	57			
	03	224	09.0		14.7	104	48.0	12.1	15	24.5	13.1	57.2	20	18 43	19 08	19 37	00	25	00	58	01	35	02				

UT	ARIES		VENUS -4.7		MARS +1.7		JUPITER -2.2		SATURN +0.7		STARS		
	GHA	GHA Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
F R I D A Y	00	277 48.3	135 04.9 N15 19.3	131 24.5 N14 46.4	240 43.0 N13 27.3	298 23.3 S10 25.2	Acamar	315 13.0 S40 12.5					
	01	292 50.8	150 05.8 18.4	146 25.5 45.9	255 45.0 27.5	313 25.8 25.2	Achernar	335 21.3 S57 06.8					
	02	307 53.3	165 06.8 17.6	161 26.5 45.4	270 47.1 27.6	328 28.4 25.2	Acrux	173 01.5 S63 14.0					
	03	322 55.7	180 07.8 16.8	176 27.5 44.8	285 49.1 27.7	343 30.9 25.3	Adhara	255 07.2 S29 00.2					
	04	337 58.2	195 08.7 16.0	191 28.5 44.3	300 51.2 27.9	358 33.4 25.3	Aldebaran	290 41.4 N16 33.3					
	05	353 00.7	210 09.7 15.2	206 29.6 43.8	315 53.2 28.0	13 35.9 25.3							
	06	8 03.1	225 10.7 N15 14.4	221 30.6 N14 43.3	330 55.2 N13 28.1	28 38.4 S10 25.3	Alioth	166 14.0 N55 50.3					
	07	23 05.6	240 11.6 13.5	236 31.6 42.8	345 57.3 28.3	43 40.9 25.4	Alkaid	152 52.8 N49 12.0					
	08	38 08.1	255 12.6 12.7	251 32.6 42.2	0 59.3 28.4	58 43.4 25.4	Alnair	27 34.2 S46 50.7					
	09	53 10.5	270 13.6 11.9	266 33.6 41.7	16 01.3 28.5	73 45.9 25.4	Alnilam	275 39.3 S 1 11.1					
	10	68 13.0	285 14.6 11.1	281 34.6 41.2	31 03.4 28.7	88 48.4 25.5	Alphard	217 49.3 S 8 45.6					
	11	83 15.4	300 15.5 10.3	296 35.6 40.7	46 05.4 28.8	103 50.9 25.5							
	12	98 17.9	315 16.5 N15 09.5	311 36.6 N14 40.2	61 07.4 N13 28.9	118 53.4 S10 25.5	Alphecca	126 04.6 N26 38.3					
	13	113 20.4	330 17.5 08.7	326 37.6 39.6	76 09.5 29.1	133 55.9 25.5	Alpheratz	357 36.0 N29 13.0					
	14	128 22.8	345 18.5 07.8	341 38.6 39.1	91 11.5 29.2	148 58.5 25.6	Altair	62 00.9 N 8 55.8					
	15	143 25.3	0 19.5 07.0	356 39.6 38.6	106 13.6 29.3	164 01.0 25.6	Ankaa	353 08.4 S42 10.5					
	16	158 27.8	15 20.5 06.2	11 40.6 38.1	121 15.6 29.5	179 03.5 25.6	Antares	112 17.1 S26 29.1					
	17	173 30.2	30 21.5 05.4	26 41.6 37.6	136 17.6 29.6	194 06.0 25.6							
	18	188 32.7	45 22.5 N15 04.6	41 42.6 N14 37.0	151 19.7 N13 29.7	209 08.5 S10 25.7	Arcturus	145 48.9 N19 03.8					
	19	203 35.2	60 23.5 03.8	56 43.6 36.5	166 21.7 29.9	224 11.0 25.7	Atria	107 11.9 S69 04.3					
	20	218 37.6	75 24.5 03.0	71 44.7 36.0	181 23.7 30.0	239 13.5 25.7	Avior	234 15.8 S59 35.1					
	21	233 40.1	90 25.5 02.1	86 45.7 35.5	196 25.8 30.1	254 16.0 25.8	Bellatrix	278 24.6 N 6 22.3					
	22	248 42.6	105 26.5 01.3	101 46.7 34.9	211 27.8 30.3	269 18.5 25.8	Betelgeuse	270 53.8 N 7 24.7					
	23	263 45.0	120 27.5 15 00.5	116 47.7 34.4	226 29.9 30.4	284 21.1 25.8							
	S A T U R D A Y	00	278 47.5	135 28.5 N14 59.7	131 48.7 N14 33.9	241 31.9 N13 30.5	299 23.6 S10 25.8	Canopus	263 53.5 S52 42.4				
01		293 49.9	150 29.5 58.9	146 49.7 33.4	256 33.9 30.7	314 26.1 25.9	Capella	280 24.2 N46 01.2					
02		308 52.4	165 30.6 58.1	161 50.7 32.9	271 36.0 30.8	329 28.6 25.9	Deneb	49 26.3 N45 21.7					
03		323 54.9	180 31.6 57.3	176 51.7 32.3	286 38.0 30.9	344 31.1 25.9	Denebola	182 26.3 N14 26.6					
04		338 57.3	195 32.6 56.4	191 52.7 31.8	301 40.1 31.0	359 33.6 26.0	Diphda	348 48.6 S17 51.4					
05		353 59.8	210 33.6 55.6	206 53.7 31.3	316 42.1 31.2	14 36.1 26.0							
06		9 02.3	225 34.6 N14 54.8	221 54.7 N14 30.8	331 44.1 N13 31.3	29 38.6 S10 26.0	Dubhe	193 42.8 N61 37.8					
07		24 04.7	240 35.7 54.0	236 55.7 30.2	346 46.2 31.4	44 41.2 26.0	Elnath	278 03.8 N28 37.6					
08		39 07.2	255 36.7 53.2	251 56.7 29.7	1 48.2 31.6	59 43.7 26.1	Eltanin	90 42.2 N51 29.2					
09		54 09.7	270 37.7 52.4	266 57.7 29.2	16 50.3 31.7	74 46.2 26.1	Enif	33 39.8 N 9 58.9					
10		69 12.1	285 38.8 51.6	281 58.8 28.7	31 52.3 31.8	89 48.7 26.1	Fomalhaut	15 15.8 S29 29.7					
11		84 14.6	300 39.8 50.8	296 59.8 28.1	46 54.3 32.0	104 51.2 26.2							
12		99 17.1	315 40.9 N14 49.9	312 00.8 N14 27.6	61 56.4 N13 32.1	119 53.7 S10 26.2	Gacrux	171 53.1 S57 14.9					
13		114 19.5	330 41.9 49.1	327 01.8 27.1	76 58.4 32.2	134 56.2 26.2	Gienah	175 44.9 S17 40.4					
14		129 22.0	345 42.9 48.3	342 02.8 26.6	92 00.5 32.4	149 58.7 26.2	Hadar	148 37.6 S60 29.4					
15		144 24.4	0 44.0 47.5	357 03.8 26.0	107 02.5 32.5	165 01.3 26.3	Hamal	327 52.8 N23 34.3					
16		159 26.9	15 45.0 46.7	12 04.8 25.5	122 04.6 32.6	180 03.8 26.3	Kaus Aust.	83 33.8 S34 22.4					
17		174 29.4	30 46.1 45.9	27 05.8 25.0	137 06.6 32.8	195 06.3 26.3							
18		189 31.8	45 47.1 N14 45.1	42 06.8 N14 24.5	152 08.6 N13 32.9	210 08.8 S10 26.4	Kochab	137 19.1 N74 03.8					
19		204 34.3	60 48.2 44.2	57 07.8 23.9	167 10.7 33.0	225 11.3 26.4	Markab	13 31.0 N15 19.8					
20		219 36.8	75 49.3 43.4	72 08.8 23.4	182 12.7 33.1	240 13.8 26.4	Menkar	314 07.7 N 4 10.9					
21		234 39.2	90 50.3 42.6	87 09.8 22.9	197 14.8 33.3	255 16.3 26.5	Menkent	147 59.0 S36 29.2					
22		249 41.7	105 51.4 41.8	102 10.8 22.4	212 16.8 33.4	270 18.9 26.5	Miaplacidus	221 39.3 S69 48.9					
23		264 44.2	120 52.4 41.0	117 11.9 21.8	227 18.9 33.5	285 21.4 26.5							
S U N D A Y		00	279 46.6	135 53.5 N14 40.2	132 12.9 N14 21.3	242 20.9 N13 33.7	300 23.9 S10 26.5	Mirfak	308 30.4 N49 56.5				
	01	294 49.1	150 54.6 39.4	147 13.9 20.8	257 22.9 33.8	315 26.4 26.6	Nunki	75 49.0 S26 16.0					
	02	309 51.6	165 55.7 38.6	162 14.9 20.3	272 25.0 33.9	330 28.9 26.6	Peacock	53 07.2 S56 39.4					
	03	324 54.0	180 56.7 37.8	177 15.9 19.7	287 27.0 34.1	345 31.4 26.6	Pollux	243 19.2 N27 58.3					
	04	339 56.5	195 57.8 36.9	192 16.9 19.2	302 29.1 34.2	0 34.0 26.7	Procyon	244 52.5 N 5 09.9					
	05	354 58.9	210 58.9 36.1	207 17.9 18.7	317 31.1 34.3	15 36.5 26.7							
	06	10 01.4	226 00.0 N14 35.3	222 18.9 N14 18.1	332 33.2 N13 34.5	30 39.0 S10 26.7	Rasalhague	95 59.4 N12 32.6					
	07	25 03.9	241 01.1 34.5	237 19.9 17.6	347 35.2 34.6	45 41.5 26.8	Regulus	207 36.0 N11 51.3					
	08	40 06.3	256 02.1 33.7	252 20.9 17.1	2 37.2 34.7	60 44.0 26.8	Rigel	281 05.4 S 8 10.4					
	09	55 08.8	271 03.2 32.9	267 21.9 16.6	17 39.3 34.8	75 46.5 26.8	Rigel Kent.	139 41.7 S60 56.1					
	10	70 11.3	286 04.3 32.1	282 23.0 16.0	32 41.3 35.0	90 49.0 26.8	Sabik	102 03.9 S15 45.2					
	11	85 13.7	301 05.4 31.3	297 24.0 15.5	47 43.4 35.1	105 51.6 26.9							
	12	100 16.2	316 06.5 N14 30.5	312 25.0 N14 15.0	62 45.4 N13 35.2	120 54.1 S10 26.9	Schedar	349 32.5 N56 39.6					
	13	115 18.7	331 07.6 29.6	327 26.0 14.4	77 47.5 35.4	135 56.6 26.9	Shaula	96 11.7 S37 07.3					
	14	130 21.1	346 08.7 28.8	342 27.0 13.9	92 49.5 35.5	150 59.1 27.0	Sirius	258 27.7 S16 44.9					
	15	145 23.6	1 09.8 28.0	357 28.0 13.4	107 51.6 35.6	166 01.6 27.0	Spica	158 23.6 S11 17.0					
	16	160 26.0	16 10.9 27.2	12 29.0 12.9	122 53.6 35.7	181 04.2 27.0	Suhail	222 47.6 S43 31.7					
	17	175 28.5	31 12.0 26.4	27 30.0 12.3	137 55.7 35.9	196 06.7 27.1							
	18	190 31.0	46 13.1 N14 25.6	42 31.0 N14 11.8	152 57.7 N13 36.0	211 09.2 S10 27.1	Vega	80 33.6 N38 48.3					
	19	205 33.4	61 14.3 24.8	57 32.0 11.3	167 59.7 36.1	226 11.7 27.1	Zuben'ubi	136 57.2 S16 08.4					
	20	220 35.9	76 15.4 24.0	72 33.0 10.7	183 01.8 36.3	241 14.2 27.2							
	21	235 38.4	91 16.5 23.2	87 34.1 10.2	198 03.8 36.4	256 16.7 27.2							
	22	250 40.8	106 17.6 22.4	102 35.1 09.7	213 05.9 36.5	271 19.3 27.2	Venus	216 41.0 14 57					
	23	265 43.3	121 18.7 21.5	117 36.1 09.1	228 07.9 36.7	286 21.8 27.2	Mars	213 01.2 15 12					
								Jupiter	322 44.4 7 53				
							Saturn	20 36.1 4 02					
Mer. Pass.	5 23.9	1.0 d 0.8	1.0 d 0.5	2.0 d 0.1	2.5 d 0.0								

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	30	1	2	3
	°	'		°	'												
F R I D A Y	d h	°	'	°	'	°	'	°	'	N 72	h m	h m	h m	h m	h m	h m	h m
	00	179	06.4	N23	11.8	49	15.2	9.5	S19	46.1	11.6	58.0					
	01	194	06.3			63	43.7	9.4	19	57.7	11.5	58.0					
	02	209	06.1			78	12.1	9.2	20	09.2	11.4	58.1					
	03	224	06.0			92	40.3	9.1	20	20.6	11.3	58.1					
	04	239	05.9			107	08.4	9.0	20	31.9	11.2	58.1					
	05	254	05.8			121	36.4	8.9	20	43.1	11.1	58.2					
	06	269	05.6	N23	11.0	136	04.3	8.7	S20	54.2	11.0	58.2					
	07	284	05.5			150	32.0	8.5	21	05.2	11.0	58.3					
	08	299	05.4			164	59.5	8.5	21	16.2	10.8	58.3					
	09	314	05.3			179	27.0	8.3	21	27.0	10.6	58.3					
	10	329	05.2			193	54.3	8.1	21	37.6	10.6	58.4					
	11	344	05.0			208	21.4	8.1	21	48.2	10.5	58.4					
	12	359	04.9	N23	10.1	222	48.5	7.9	S21	58.7	10.4	58.4					
	13	14	04.8			237	15.4	7.7	22	09.1	10.2	58.5					
	14	29	04.7			251	42.1	7.7	22	19.3	10.1	58.5					
	15	44	04.5			266	08.8	7.5	22	29.4	10.0	58.6					
	16	59	04.4			280	35.3	7.3	22	39.4	9.9	58.6					
	17	74	04.3			295	01.6	7.2	22	49.3	9.8	58.6					
	18	89	04.2	N23	09.1	309	27.8	7.1	S22	59.1	9.6	58.7					
	19	104	04.1			323	53.9	7.0	23	08.7	9.6	58.7					
	20	119	03.9			338	19.9	6.8	23	18.3	9.3	58.7					
	21	134	03.8			352	45.7	6.7	23	27.6	9.3	58.8					
	22	149	03.7			7	11.4	6.5	23	36.9	9.1	58.8					
	23	164	03.6			21	36.9	6.4	23	46.0	9.0	58.9					
S A T U R D A Y	100	179	03.4	N23	08.2	36	02.3	6.3	S23	55.0	8.8	58.9					
	01	194	03.3			50	27.6	6.2	24	03.8	8.7	58.9					
	02	209	03.2			64	52.8	6.0	24	12.5	8.6	59.0					
	03	224	03.1			79	17.8	5.8	24	21.1	8.4	59.0					
	04	239	03.0			93	42.6	5.8	24	29.5	8.3	59.0					
	05	254	02.8			108	07.4	5.6	24	37.8	8.1	59.1					
	06	269	02.7	N23	07.2	122	32.0	5.5	S24	45.9	8.0	59.1					
	07	284	02.6			136	56.5	5.4	24	53.9	7.8	59.1					
	08	299	02.5			151	20.9	5.2	25	01.7	7.7	59.2					
	09	314	02.4			165	45.1	5.1	25	09.4	7.5	59.2					
	10	329	02.2			180	09.2	5.0	25	16.9	7.4	59.2					
	11	344	02.1			194	33.2	4.8	25	24.3	7.2	59.3					
	12	359	02.0	N23	06.2	208	57.0	4.8	S25	31.5	7.0	59.3					
	13	14	01.9			223	20.8	4.6	25	38.5	6.9	59.4					
	14	29	01.8			237	44.4	4.4	25	45.4	6.7	59.4					
	15	44	01.6			252	07.8	4.4	25	52.1	6.6	59.4					
	16	59	01.5			266	31.2	4.3	25	58.7	6.4	59.5					
	17	74	01.4			280	54.5	4.1	26	05.1	6.2	59.5					
	18	89	01.3	N23	05.2	295	17.6	4.0	S26	11.3	6.0	59.5					
	19	104	01.2			309	40.6	3.9	26	17.3	5.9	59.6					
	20	119	01.0			324	03.5	3.8	26	23.2	5.7	59.6					
	21	134	00.9			338	26.3	3.7	26	28.9	5.5	59.6					
	22	149	00.8			352	49.0	3.6	26	34.4	5.3	59.6					
	23	164	00.7			7	11.6	3.5	26	39.7	5.2	59.7					
	S U N D A Y	200	179	00.6	N23	04.1	21	34.1	3.4	S26	44.9	4.9	59.7				
01		194	00.4			35	56.5	3.2	26	49.8	4.8	59.7					
02		209	00.3			50	18.7	3.2	26	54.6	4.6	59.8					
03		224	00.2			64	40.9	3.1	26	59.2	4.4	59.8					
04		239	00.1			79	03.0	3.0	27	03.6	4.3	59.8					
05		254	00.0			93	25.0	2.9	27	07.9	4.0	59.9					
06		268	59.9	N23	03.1	107	46.9	2.8	S27	11.9	3.8	59.9					
07		283	59.7			122	08.7	2.7	27	15.7	3.7	59.9					
08		298	59.6			136	30.4	2.6	27	19.4	3.4	59.9					
09		313	59.5			150	52.0	2.6	27	22.8	3.3	60.0					
10		328	59.4			165	13.6	2.4	27	26.1	3.1	60.0					
11		343	59.3			179	35.0	2.4	27	29.2	2.8	60.0					
12		358	59.2	N23	02.0	193	56.4	2.4	S27	32.0	2.7	60.1					
13		13	59.0			208	17.8	2.2	27	34.7	2.5	60.1					
14		28	58.9			222	39.0	2.2	27	37.2	2.2	60.1					
15		43	58.8			237	00.2	2.1	27	39.4	2.1	60.1					
16		58	58.7			251	21.3	2.1	27	41.5	1.9	60.2					
17		73	58.6			265	42.4	2.0	27	43.4	1.6	60.2					
18		88	58.5	N23	00.8	280	03.4	2.0	S27	45.0	1.5	60.2					
19		103	58.3			294	24.4	1.9	27	46.5	1.2	60.2					
20		118	58.2			308	45.3	1.8	27	47.7	1.0	60.3					
21		133	58.1			323	06.1	1.8	27	48.7	0.9	60.3					
22		148	58.0			337	26.9	1.8	27	49.6	0.6	60.3					
23		163	57.9	N22	59.9	351	47.7	1.7	S27	50.2	0.4	60.3					
		SD	15.8	d	0.2	SD	15.9	16.2	16.4	SUN		MOON					
									Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
										00 ^h	12 ^h	Pass.	Upper	Lower			
	d	m	s		m	s			30	03 34	03 40	12 04	21 30	09 02	12 88		
	1	03 46	03 52	12 04	22 30	09 59	13 94										
	2	03 57	04 03	12 04	23 34	11 02	14 98										

UT		ARIES	VENUS −4.7			MARS +1.7	JUPITER −2.2			SATURN +0.6	STARS			
		GHA	GHA	Dec		GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
		° / ' / "	° / ' / "	° / ' / "		° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "		° / ' / "	° / ' / "
MONDAY	3 00	280 45.8	136 19.9	N14 20.7		132 37.1	N14 08.6	243 10.0	N13 36.8	301 24.3	S10 27.3	Acamar	315 13.0	S40 12.4
	01	295 48.2	151 21.0	19.9		147 38.1	08.1	258 12.0	36.9	316 26.8	27.3	Achernar	335 21.3	S57 06.8
	02	310 50.7	166 22.1	19.1		162 39.1	07.6	273 14.1	37.0	331 29.3	27.3	AcruX	173 01.5	S63 14.0
	03	325 53.2	181 23.3	18.3		177 40.1	07.0	288 16.1	37.2	346 31.9	27.4	Adhara	255 07.2	S29 00.2
	04	340 55.6	196 24.4	17.5		192 41.1	06.5	303 18.2	37.3	1 34.4	27.4	Aldebaran	290 41.4	N16 33.4
	05	355 58.1	211 25.5	16.7		207 42.1	06.0	318 20.2	37.4	16 36.9	27.4			
	06	11 00.5	226 26.7	N14 15.9		222 43.1	N14 05.4	333 22.3	N13 37.6	31 39.4	S10 27.5	Alioth	166 14.1	N55 50.3
	07	26 03.0	241 27.8	15.1		237 44.1	04.9	348 24.3	37.7	46 41.9	27.5	Alkaid	152 52.9	N49 12.0
	08	41 05.5	256 29.0	14.3		252 45.2	04.4	3 26.4	37.8	61 44.5	27.5	Alnair	27 34.2	S46 50.7
	09	56 07.9	271 30.1	13.5		267 46.2	03.8	18 28.4	37.9	76 47.0	27.6	Alnilam	275 39.3	S 1 11.2
	10	71 10.4	286 31.3	12.7		282 47.2	03.3	33 30.5	38.1	91 49.5	27.6	Alphard	217 49.3	S 8 45.6
	11	86 12.9	301 32.4	11.8		297 48.2	02.8	48 32.5	38.2	106 52.0	27.6			
	12	101 15.3	316 33.6	N14 11.0		312 49.2	N14 02.2	63 34.6	N13 38.3	121 54.5	S10 27.7	Alphecca	126 04.6	N26 38.3
	13	116 17.8	331 34.7	10.2		327 50.2	01.7	78 36.6	38.4	136 57.1	27.7	Alpheratz	357 36.0	N29 13.0
	14	131 20.3	346 35.9	09.4		342 51.2	01.2	93 38.7	38.6	151 59.6	27.7	Altair	62 00.9	N 8 55.8
	15	146 22.7	1 37.0	08.6		357 52.2	00.6	108 40.7	38.7	167 02.1	27.8	Ankaa	353 08.3	S42 10.5
	16	161 25.2	16 38.2	07.8		12 53.2	14 00.1	123 42.8	38.8	182 04.6	27.8	Antares	112 17.1	S26 29.1
	17	176 27.7	31 39.4	07.0		27 54.2	13 59.6	138 44.8	39.0	197 07.1	27.8			
	18	191 30.1	46 40.5	N14 06.2		42 55.3	N13 59.0	153 46.9	N13 39.1	212 09.7	S10 27.8	Arcturus	145 48.9	N19 03.8
	19	206 32.6	61 41.7	05.4		57 56.3	58.5	168 48.9	39.2	227 12.2	27.9	Atria	107 11.9	S69 04.3
	20	221 35.0	76 42.9	04.6		72 57.3	58.0	183 51.0	39.3	242 14.7	27.9	Avior	234 15.9	S59 35.1
	21	236 37.5	91 44.1	03.8		87 58.3	57.4	198 53.0	39.5	257 17.2	27.9	Bellatrix	278 24.5	N 6 22.3
	22	251 40.0	106 45.2	03.0		102 59.3	56.9	213 55.1	39.6	272 19.8	28.0	Betelgeuse	270 53.8	N 7 24.7
	23	266 42.4	121 46.4	02.2		118 00.3	56.4	228 57.1	39.7	287 22.3	28.0			
TUESDAY	4 00	281 44.9	136 47.6	N14 01.4		133 01.3	N13 55.8	243 59.2	N13 39.8	302 24.8	S10 28.0	Canopus	263 53.5	S52 42.4
	01	296 47.4	151 48.8	14 00.6		148 02.3	55.3	259 01.2	40.0	317 27.3	28.1	Capella	280 24.2	N46 01.2
	02	311 49.8	166 50.0	13 59.8		163 03.3	54.8	274 03.3	40.1	332 29.8	28.1	Deneb	49 26.2	N45 21.7
	03	326 52.3	181 51.2	59.0		178 04.3	54.2	289 05.3	40.2	347 32.4	28.1	Denebola	182 26.3	N14 26.6
	04	341 54.8	196 52.4	58.1		193 05.4	53.7	304 07.4	40.4	2 34.9	28.2	Diphda	348 48.6	S17 51.4
	05	356 57.2	211 53.6	57.3		208 06.4	53.2	319 09.4	40.5	17 37.4	28.2			
	06	11 59.7	226 54.8	N13 56.5		223 07.4	N13 52.6	334 11.5	N13 40.6	32 39.9	S10 28.2	Dubhe	193 42.8	N61 37.8
	07	27 02.2	241 56.0	55.7		238 08.4	52.1	349 13.5	40.7	47 42.5	28.3	Elnath	278 03.8	N28 37.6
	08	42 04.6	256 57.2	54.9		253 09.4	51.6	4 15.6	40.9	62 45.0	28.3	Eltanin	90 42.2	N51 29.2
	09	57 07.1	271 58.4	54.1		268 10.4	51.0	19 17.6	41.0	77 47.5	28.3	Enif	33 39.8	N 9 58.9
	10	72 09.5	286 59.6	53.3		283 11.4	50.5	34 19.7	41.1	92 50.0	28.4	Fomalhaut	15 15.7	S29 29.7
	11	87 12.0	302 00.8	52.5		298 12.4	50.0	49 21.7	41.2	107 52.6	28.4			
	12	102 14.5	317 02.0	N13 51.7		313 13.4	N13 49.4	64 23.8	N13 41.4	122 55.1	S10 28.4	Gacrux	171 53.1	S57 14.9
	13	117 16.9	332 03.2	50.9		328 14.5	48.9	79 25.9	41.5	137 57.6	28.5	Gienah	175 44.9	S17 40.4
	14	132 19.4	347 04.5	50.1		343 15.5	48.4	94 27.9	41.6	153 00.1	28.5	Hadar	148 37.6	S60 29.4
	15	147 21.9	2 05.7	49.3		358 16.5	47.8	109 30.0	41.7	168 02.7	28.5	Hamal	327 52.7	N23 34.3
	16	162 24.3	17 06.9	48.5		13 17.5	47.3	124 32.0	41.9	183 05.2	28.6	Kaus Aust.	83 33.8	S34 22.4
	17	177 26.8	32 08.1	47.7		28 18.5	46.7	139 34.1	42.0	198 07.7	28.6			
	18	192 29.3	47 09.4	N13 46.9		43 19.5	N13 46.2	154 36.1	N13 42.1	213 10.2	S10 28.6	Kochab	137 19.1	N74 03.8
	19	207 31.7	62 10.6	46.1		58 20.5	45.7	169 38.2	42.2	228 12.8	28.7	Markab	13 31.0	N15 19.8
	20	222 34.2	77 11.8	45.3		73 21.5	45.1	184 40.2	42.4	243 15.3	28.7	Menkar	314 07.7	N 4 10.9
	21	237 36.7	92 13.1	44.5		88 22.5	44.6	199 42.3	42.5	258 17.8	28.7	Menkent	147 59.0	S36 29.3
	22	252 39.1	107 14.3	43.7		103 23.6	44.1	214 44.3	42.6	273 20.3	28.8	Miaplacidus	221 39.3	S69 48.9
	23	267 41.6	122 15.6	42.9		118 24.6	43.5	229 46.4	42.7	288 22.9	28.8			
WEDNESDAY	5 00	282 44.0	137 16.8	N13 42.1		133 25.6	N13 43.0	244 48.5	N13 42.9	303 25.4	S10 28.8	Mirfak	308 30.4	N49 56.5
	01	297 46.5	152 18.0	41.3		148 26.6	42.4	259 50.5	43.0	318 27.9	28.9	Nunki	75 48.9	S26 16.0
	02	312 49.0	167 19.3	40.5		163 27.6	41.9	274 52.6	43.1	333 30.4	28.9	Peacock	53 07.1	S56 39.4
	03	327 51.4	182 20.6	39.7		178 28.6	41.4	289 54.6	43.2	348 33.0	28.9	Pollux	243 19.2	N27 58.2
	04	342 53.9	197 21.8	38.9		193 29.6	40.8	304 56.7	43.4	3 35.5	29.0	Procyon	244 52.5	N 5 09.9
	05	357 56.4	212 23.1	38.1		208 30.6	40.3	319 58.7	43.5	18 38.0	29.0			
	06	12 58.8	227 24.3	N13 37.3		223 31.6	N13 39.8	335 00.8	N13 43.6	33 40.5	S10 29.0	Rasalhague	95 59.4	N12 32.6
	07	28 01.3	242 25.6	36.5		238 32.7	39.2	350 02.9	43.7	48 43.1	29.1	Regulus	207 36.0	N11 51.3
	08	43 03.8	257 26.9	35.7		253 33.7	38.7	5 04.9	43.9	63 45.6	29.1	Rigel	281 05.4	S 8 10.4
	09	58 06.2	272 28.1	34.9		268 34.7	38.1	20 07.0	44.0	78 48.1	29.2	Rigel Kent.	139 41.7	S60 56.1
	10	73 08.7	287 29.4	34.1		283 35.7	37.6	35 09.0	44.1	93 50.7	29.2	Sabik	102 03.9	S15 45.2
	11	88 11.2	302 30.7	33.3		298 36.7	37.1	50 11.1	44.2	108 53.2	29.2			
	12	103 13.6	317 31.9	N13 32.5		313 37.7	N13 36.5	65 13.1	N13 44.4	123 55.7	S10 29.3	Schedar	349 32.5	N56 39.7
	13	118 16.1	332 33.2	31.7		328 38.7	36.0	80 15.2	44.5	138 58.2	29.3	Shaula	96 11.7	S37 07.3
	14	133 18.5	347 34.5	30.9		343 39.7	35.4	95 17.3	44.6	154 00.8	29.3	Sirius	258 27.7	S16 44.8
	15	148 21.0	2 35.8	30.1		358 40.8	34.9	110 19.3	44.7	169 03.3	29.4	Spica	158 23.6	S11 17.0
	16	163 23.5	17 37.1	29.3		13 41.8	34.4	125 21.4	44.9	184 05.8	29.4	Suhail	222 47.6	S43 31.7
	17	178 25.9	32 38.4	28.5		28 42.8	33.8	140 23.4	45.0	199 08.4	29.4			
	18	193 28.4	47 39.7	N13 27.7		43 43.8	N13 33.3	155 25.5	N13 45.1	214 10.9	S10 29.5	Vega	80 33.6	N38 48.3
	19	208 30.9	62 41.0	26.9		58 44.8	32.7	170 27.6	45.2	229 13.4	29.5	Zuben'ubi	136 57.2	S16 08.4
	20	223 33.3	77 42.3	26.1		73 45.8	32.2	185 29.6	45.4	244 15.9	29.5			
	21	238 35.8	92 43.6	25.4		88 46.8	31.7	200 31.7	45.5	259 18.5	29.6			
	22	253 38.3	107 44.9	24.6		103 47.8	31.1	215 33.7	45.6	274 21.0	29.6	Venus	215 02.7	14 52
	23	268 40.7	122 46.2	23.8		118 48.8	30.6	230 35.8	45.7	289 23.5	29.6	Mars	211 16.4	15 07
		h m										Jupiter	322 14.3	7 43
Mer. Pass.		5 12.2	ν 1.2	d 0.8		ν 1.0	d 0.5	ν 2.1	d 0.1	ν 2.5	d 0.0	Saturn	20 39.9	3 50

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	3	4	5	6				
	°	'		°	'																
MONDAY	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m		
	3 00	178	57.8	N22	59.7	6	08.4	1.7	S27	50.6	0.2	60.4									
	01	193	57.6		59.5	20	29.1	1.7	27	50.8	0.0	60.4							01 44		
	02	208	57.5		59.3	34	49.8	1.6	27	50.8	0.2	60.4							00 47		
	03	223	57.4		59.1	49	10.4	1.6	27	50.6	0.5	60.4	64	////	////	00 40			01 46		
	04	238	57.3		58.9	63	31.0	1.6	27	50.1	0.6	60.4	62	////	////	01 46			02 36		
	05	253	57.2		58.7	77	51.6	1.6	27	49.5	0.9	60.5	60	////	////	02 21	23 36	23 32	23 28		
	06	268	57.1	N22	58.5	92	12.2	1.5	S27	48.6	1.0	60.5	58	////	01 10	02 45	22 47	23 05	23 12		
	07	283	57.0		58.3	106	32.7	1.6	27	47.6	1.3	60.5	56	////	01 53	03 05	22 16	22 44	22 58		
	08	298	56.8		58.1	120	53.3	1.5	27	46.3	1.5	60.5	54	01 05	02 41	03 34	21 33	22 11	22 36		
	09	313	56.7		57.9	135	13.8	1.5	27	44.8	1.7	60.5	52	01 44	02 58	03 46	21 17	21 58	22 26		
	10	328	56.6		57.7	149	34.3	1.5	27	43.1	1.9	60.6	50	02 09	03 13	03 57	21 03	21 47	22 18		
	11	343	56.5		57.5	163	54.8	1.6	27	41.2	2.1	60.6	45	02 53	03 42	04 19	20 34	21 23	22 00		
	12	358	56.4	N22	57.3	178	15.4	1.5	S27	39.1	2.4	60.6	N 40	03 22	04 04	04 36	20 12	21 04	21 45		
	13	13	56.3		57.1	192	35.9	1.5	27	36.7	2.5	60.6	35	03 45	04 21	04 51	19 53	20 48	21 32		
	14	28	56.2		56.9	206	56.4	1.6	27	34.2	2.8	60.6	30	04 03	04 36	05 04	19 37	20 34	21 21		
	15	43	56.0		56.7	221	17.0	1.5	27	31.4	3.0	60.6	20	04 32	05 01	05 25	19 10	20 10	21 02		
	16	58	55.9		56.5	235	37.5	1.6	27	28.4	3.1	60.7	N 10	04 54	05 21	05 44	18 46	19 49	20 46		
	17	73	55.8		56.3	249	58.1	1.6	27	25.3	3.4	60.7	0	05 12	05 38	06 01	18 25	19 29	20 30		
	18	88	55.7	N22	56.1	264	18.7	1.7	S27	21.9	3.6	60.7	S 10	05 29	05 55	06 18	18 03	19 10	20 15		
	19	103	55.6		55.9	278	39.4	1.6	27	18.3	3.9	60.7	20	05 45	06 12	06 36	17 39	18 49	19 58		
	20	118	55.5		55.7	293	00.0	1.7	27	14.4	4.0	60.7	30	06 01	06 30	06 57	17 12	18 24	19 38		
	21	133	55.4		55.5	307	20.7	1.7	27	10.4	4.2	60.7	35	06 09	06 41	07 09	16 56	18 10	19 27		
	22	148	55.2		55.3	321	41.4	1.8	27	06.2	4.4	60.7	40	06 18	06 52	07 22	16 37	17 53	19 14		
	23	163	55.1		55.1	336	02.2	1.8	27	01.8	4.7	60.7	45	06 28	07 05	07 39	16 14	17 33	18 58		
TUESDAY	4 00	178	55.0	N22	54.8	350	23.0	1.9	S26	57.1	4.8	60.8	S 50	06 39	07 21	07 59	15 45	17 08	18 39		
	01	193	54.9		54.6	4	43.9	1.9	26	52.3	5.1	60.8	52	06 44	07 28	08 08	15 31	16 56	18 30		
	02	208	54.8		54.4	19	04.8	1.9	26	47.2	5.3	60.8	54	06 50	07 36	08 19	15 14	16 42	18 20		
	03	223	54.7		54.2	33	25.7	2.0	26	41.9	5.4	60.8	56	06 56	07 44	08 31	14 54	16 26	18 08		
	04	238	54.6		54.0	47	46.7	2.1	26	36.5	5.7	60.8	58	07 02	07 54	08 45	14 30	16 06	17 54		
	05	253	54.5		53.8	62	07.8	2.1	26	30.8	5.9	60.8	S 60	07 09	08 06	09 02	13 57	15 42	17 38		
	06	268	54.4	N22	53.6	76	28.9	2.1	S26	24.9	6.0	60.8		Lat.	Sunset	Twilight		Moonset			
	07	283	54.2		53.4	90	50.0	2.3	26	18.9	6.3	60.8				Civil	Naut.	3	4	5	6
	08	298	54.1		53.1	105	11.3	2.3	26	12.6	6.4	60.8									
	09	313	54.0		52.9	119	32.6	2.4	26	06.2	6.7	60.8									
	10	328	53.9		52.7	133	54.0	2.4	25	59.5	6.8	60.8									
	11	343	53.8		52.5	148	15.4	2.5	25	52.7	7.1	60.9	N 72	°	h m	h m	h m	h m	h m	h m	h m
	12	358	53.7	N22	52.3	162	36.9	2.6	S25	45.6	7.2	60.9	N 70	°	h m	h m	h m	h m	h m	h m	h m
	13	13	53.6		52.0	176	58.5	2.7	25	38.4	7.5	60.9	68	°	h m	h m	h m	h m	h m	h m	h m
	14	28	53.5		51.8	191	20.2	2.7	25	30.9	7.6	60.9	66	23 24	////	////	////	////	////	////	////
	15	43	53.4		51.6	205	41.9	2.9	25	23.3	7.8	60.9	64	22 21	////	////	////	////	////	////	////
	16	58	53.2		51.4	220	03.8	2.9	25	15.5	8.0	60.9	62	21 47	////	////	////	////	////	////	////
	17	73	53.1		51.2	234	25.7	3.0	25	07.5	8.1	60.9	60	21 23	22 56	////	////	01 10	02 39	04 35	
	18	88	53.0	N22	50.9	248	47.7	3.1	S24	59.4	8.4	60.9	N 58	21 03	22 15	////	////	01 47	03 10	04 56	
	19	103	52.9		50.7	263	09.8	3.2	24	51.0	8.5	60.9	56	20 47	21 48	////	////	02 13	03 33	05 13	
	20	118	52.8		50.5	277	32.0	3.3	24	42.5	8.7	60.9	54	20 34	21 27	23 02	02 34	03 52	05 27		
	21	133	52.7		50.3	291	54.3	3.4	24	33.8	8.9	60.9	52	20 22	21 10	22 24	02 51	04 08	05 39		
	22	148	52.6		50.0	306	16.7	3.4	24	24.9	9.1	60.9	50	20 12	20 55	21 59	03 06	04 22	05 50		
	23	163	52.5		49.8	320	39.1	3.6	24	15.8	9.3	60.9	45	19 50	20 27	21 15	03 36	04 50	06 13		
	WEDNESDAY	5 00	178	52.4	N22	49.6	335	01.7	3.7	S24	06.5	9.4	60.9	N 40	19 32	20 05	20 46	04 00	05 12	06 31	
01		193	52.3		49.4	349	24.4	3.8	23	57.1	9.6	60.9	35	19 18	19 47	20 24	04 19	05 30	06 47		
02		208	52.1		49.1	3	47.2	3.8	23	47.5	9.7	60.9	30	19 05	19 32	20 05	04 36	05 46	07 00		
03		223	52.0		48.9	18	10.0	4.0	23	37.8	9.9	60.9	20	18 44	19 08	19 37	05 04	06 12	07 22		
04		238	51.9		48.7	32	33.0	4.1	23	27.9	10.1	60.9	N 10	18 25	18 48	19 15	05 28	06 35	07 41		
05		253	51.8		48.4	46	56.1	4.2	23	17.8	10.3	60.9	0	18 08	18 31	18 57	05 50	06 56	07 59		
06		268	51.7	N22	48.2	61	19.3	4.3	S23	07.5	10.4	60.9	S 10	17 51	18 14	18 40	06 12	07 17	08 16		
07		283	51.6		48.0	75	42.6	4.4	22	57.1	10.5	60.9	20	17 33	17 57	18 24	06 36	07 39	08 35		
08		298	51.5		47.8	90	06.0	4.5	22	46.6	10.7	60.9	30	17 12	17 39	18 08	07 04	08 05	08 57		
09		313	51.4		47.5	104	29.5	4.7	22	35.9	10.9	60.9	35	17 00	17 28	18 00	07 20	08 20	09 09		
10		328	51.3		47.3	118	53.2	4.7	22	25.0	11.0	60.9	40	16 47	17 17	17 51	07 39	08 37	09 23		
11		343	51.2		47.1	133	16.9	4.8	22	14.0	11.2	60.8	45	16 30	17 04	17 41	08 02	08 58	09 40		
12		358	51.1	N22	46.8	147	40.7	5.0	S22	02.8	11.3	60.8	S 50	16 10	16 48	17 30	08 32	09 24	10 01		
13		13	51.0		46.6	162	04.7	5.1	21	51.5	11.5	60.8	52	16 01	16 41	17 25	08 46	09 37	10 11		
14		28	50.9		46.3	176	28.8	5.2	21	40.0	11.6	60.8	54	15 50	16 33	17 19	09 03	09 51	10 22		
15		43	50.7		46.1	190	53.0	5.3	21	28.4	11.8	60.8	56	15 38	16 25	17 13	09 23	10 08	10 34		
16		58	50.6		45.9	205	17.3	5.4	21	16.6	11.9	60.8	58	15 24	16 15	17 07	09 48	10 28	10 48		
17	73	50.5		45.6	219	41.7	5.5	21	04.7	12.0	60.8	S 60	15 07	16 04	17 00	10 21	10 5				

UT	ARIES		VENUS -4.7		MARS +1.7		JUPITER -2.2		SATURN +0.6		STARS				
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
T H U R S D A Y	6 00	283 43.2	137 47.5	N13 23.0	133 49.9	N13 30.0	245 37.9	N13 45.9	304 26.1	S10 29.7	319 28.6	29.7	Acamar	315 12.9	S40 12.4
	01	298 45.7	152 48.8	22.2	148 50.9	29.5	260 39.9	46.0	319 28.6	29.7	304 26.1	29.7	Achernar	335 21.2	S57 06.8
	02	313 48.1	167 50.1	21.4	163 51.9	29.0	275 42.0	46.1	334 31.1	29.7	349 33.6	29.8	Acrux	173 01.6	S63 14.0
	03	328 50.6	182 51.4	20.6	178 52.9	28.4	290 44.0	46.2	349 33.6	29.8	4 36.2	29.8	Adhara	255 07.2	S29 00.2
	04	343 53.0	197 52.7	19.8	193 53.9	27.9	305 46.1	46.3	4 36.2	29.8	19 38.7	29.9	Aldebaran	290 41.3	N16 33.4
	05	358 55.5	212 54.0	19.0	208 54.9	27.3	320 48.2	46.5	19 38.7	29.9	34 41.2	S10 29.9	Alioth	166 14.1	N55 50.3
	06	13 58.0	227 55.4	N13 18.2	223 55.9	N13 26.8	335 50.2	N13 46.6	34 41.2	S10 29.9	49 43.8	29.9	Alkaid	152 52.9	N49 12.0
	07	29 00.4	242 56.7	17.4	238 56.9	26.2	350 52.3	46.7	49 43.8	29.9	64 46.3	30.0	Alnair	27 34.1	S46 50.0
	08	44 02.9	257 58.0	16.6	253 58.0	25.7	5 54.3	46.8	64 46.3	30.0	79 48.8	30.0	Anilam	275 39.3	S 1 11.0
	09	59 05.4	272 59.4	15.8	268 59.0	25.2	20 56.4	47.0	79 48.8	30.0	94 51.4	30.0	Alphard	217 49.3	S 8 45.6
	10	74 07.8	288 00.7	15.0	284 00.0	24.6	35 58.5	47.1	94 51.4	30.0	109 53.9	30.1			
	11	89 10.3	303 02.0	14.2	299 01.0	24.1	51 00.5	47.2	109 53.9	30.1	124 56.4	S10 30.1	Alphecca	126 04.6	N26 38.3
	12	104 12.8	318 03.4	N13 13.5	314 02.0	N13 23.5	66 02.6	N13 47.3	124 56.4	S10 30.1	139 59.0	30.1	Alpheratz	357 36.0	N29 13.0
	13	119 15.2	333 04.7	12.7	329 03.0	23.0	81 04.6	47.4	139 59.0	30.1	155 01.5	30.2	Altair	62 00.8	N 8 55.8
	14	134 17.7	348 06.0	11.9	344 04.0	22.4	96 06.7	47.6	155 01.5	30.2	170 04.0	30.2	Ankaa	353 08.3	S42 10.5
	15	149 20.1	3 07.4	11.1	359 05.0	21.9	111 08.8	47.7	170 04.0	30.2	185 06.6	30.3	Antares	112 17.1	S26 29.1
	16	164 22.6	18 08.7	10.3	14 06.1	21.4	126 10.8	47.8	185 06.6	30.3	200 09.1	30.3			
	17	179 25.1	33 10.1	09.5	29 07.1	20.8	141 12.9	47.9	200 09.1	30.3	215 11.6	S10 30.3	Arcturus	145 48.9	N19 03.8
	18	194 27.5	48 11.5	N13 08.7	44 08.1	N13 20.3	156 15.0	N13 48.1	215 11.6	S10 30.3	230 14.2	30.4	Atria	107 11.9	S69 04.3
	19	209 30.0	63 12.8	07.9	59 09.1	19.7	171 17.0	48.2	230 14.2	30.4	245 16.7	30.4	Avior	234 15.9	S59 35.1
	20	224 32.5	78 14.2	07.1	74 10.1	19.2	186 19.1	48.3	245 16.7	30.4	260 19.2	30.4	Bellatrix	278 24.5	N 6 22.3
	21	239 34.9	93 15.5	06.3	89 11.1	18.6	201 21.2	48.4	260 19.2	30.4	275 21.7	30.5	Betelgeuse	270 53.8	N 7 24.7
	22	254 37.4	108 16.9	05.6	104 12.1	18.1	216 23.2	48.5	275 21.7	30.5	290 24.3	30.5			
	23	269 39.9	123 18.3	04.8	119 13.2	17.5	231 25.3	48.7	290 24.3	30.5	305 26.8	S10 30.5	Canopus	263 53.5	S52 42.4
F R I D A Y	7 00	284 42.3	138 19.6	N13 04.0	134 14.2	N13 17.0	246 27.3	N13 48.8	305 26.8	S10 30.5	320 29.3	30.6	Capella	280 24.2	N46 01.2
	01	299 44.8	153 21.0	03.2	149 15.2	16.5	261 29.4	48.9	320 29.3	30.6	335 31.9	30.6	Deneb	49 26.2	N45 21.7
	02	314 47.3	168 22.4	02.4	164 16.2	15.9	276 31.5	49.0	335 31.9	30.6	350 34.4	30.7	Denebola	182 26.3	N14 26.6
	03	329 49.7	183 23.8	01.6	179 17.2	15.4	291 33.5	49.2	350 34.4	30.7	5 37.0	30.7	Diphda	348 48.5	S17 51.4
	04	344 52.2	198 25.2	00.8	194 18.2	14.8	306 35.6	49.3	5 37.0	30.7	20 39.5	30.7			
	05	359 54.6	213 26.5	13 00.1	209 19.2	14.3	321 37.7	49.4	20 39.5	30.7	35 42.0	S10 30.8	Dubhe	193 42.9	N61 37.8
	06	14 57.1	228 27.9	N12 59.3	224 20.2	N13 13.7	336 39.7	N13 49.5	35 42.0	S10 30.8	50 44.6	30.8	Elnath	278 03.8	N28 37.6
	07	29 59.6	243 29.3	58.5	239 21.3	13.2	351 41.8	49.6	50 44.6	30.8	65 47.1	30.8	Eltanin	90 42.2	N51 29.2
	08	45 02.0	258 30.7	57.7	254 22.3	12.6	6 43.9	49.8	65 47.1	30.8	80 49.6	30.9	Enif	33 39.8	N 9 58.9
	09	60 04.5	273 32.1	56.9	269 23.3	12.1	21 45.9	49.9	80 49.6	30.9	95 52.2	30.9	Fomalhaut	15 15.7	S29 29.7
	10	75 07.0	288 33.5	56.1	284 24.3	11.5	36 48.0	50.0	95 52.2	30.9	110 54.7	31.0			
	11	90 09.4	303 34.9	55.3	299 25.3	11.0	51 50.1	50.1	110 54.7	31.0	125 57.2	S10 31.0	Gacrux	171 53.1	S57 14.9
	12	105 11.9	318 36.3	N12 54.6	314 26.3	N13 10.5	66 52.1	N13 50.2	125 57.2	S10 31.0	140 59.8	31.0	Gienah	175 44.9	S17 40.4
	13	120 14.4	333 37.7	53.8	329 27.3	09.9	81 54.2	50.4	140 59.8	31.0	156 02.3	31.1	Hadar	148 37.6	S60 29.4
	14	135 16.8	348 39.1	53.0	344 28.4	09.4	96 56.3	50.5	156 02.3	31.1	171 04.8	31.1	Hamal	327 52.7	N23 34.3
	15	150 19.3	3 40.5	52.2	359 29.4	08.8	111 58.3	50.6	171 04.8	31.1	186 07.4	31.1	Kaus Aust.	83 33.8	S34 22.4
	16	165 21.8	18 42.0	51.4	14 30.4	08.3	127 00.4	50.7	186 07.4	31.1	201 09.9	31.2			
	17	180 24.2	33 43.4	50.6	29 31.4	07.7	142 02.5	50.8	201 09.9	31.2	216 12.4	S10 31.2	Kochab	137 19.2	N74 03.8
	18	195 26.7	48 44.8	N12 49.9	44 32.4	N13 07.2	157 04.5	N13 51.0	216 12.4	S10 31.2	231 15.0	31.3	Markab	13 31.0	N15 19.8
	19	210 29.1	63 46.2	49.1	59 33.4	06.6	172 06.6	51.1	231 15.0	31.3	246 17.5	31.3	Menkar	314 07.6	N 4 10.9
	20	225 31.6	78 47.6	48.3	74 34.4	06.1	187 08.7	51.2	246 17.5	31.3	261 20.1	31.3	Menkent	147 59.0	S36 29.3
	21	240 34.1	93 49.1	47.5	89 35.4	05.5	202 10.7	51.3	261 20.1	31.3	276 22.6	31.4	Miaplacidus	221 39.4	S69 48.9
	22	255 36.5	108 50.5	46.7	104 36.5	05.0	217 12.8	51.4	276 22.6	31.4	291 25.1	31.4			
	23	270 39.0	123 51.9	46.0	119 37.5	04.4	232 14.9	51.6	291 25.1	31.4	306 27.7	S10 31.4	Mirfak	308 30.4	N49 56.5
S A T U R D A Y	8 00	285 41.5	138 53.4	N12 45.2	134 38.5	N13 03.9	247 17.0	N13 51.7	306 27.7	S10 31.4	321 30.2	31.5	Nunki	75 48.9	S26 16.0
	01	300 43.9	153 54.8	44.4	149 39.5	03.3	262 19.0	51.8	321 30.2	31.5	336 32.7	31.5	Peacock	53 07.1	S56 39.5
	02	315 46.4	168 56.3	43.6	164 40.5	02.8	277 21.1	51.9	336 32.7	31.5	351 35.3	31.6	Pollux	243 19.2	N27 58.2
	03	330 48.9	183 57.7	42.8	179 41.5	02.2	292 23.2	52.0	351 35.3	31.6	6 37.8	31.6	Procyon	244 52.5	N 5 10.0
	04	345 51.3	198 59.2	42.1	194 42.5	01.7	307 25.2	52.2	6 37.8	31.6	21 40.3	31.6			
	05	0 53.8	214 00.6	41.3	209 43.6	01.1	322 27.3	52.3	21 40.3	31.6	36 42.9	S10 31.7	Rasalhague	95 59.4	N12 32.6
	06	15 56.2	229 02.1	N12 40.5	224 44.6	N13 00.6	337 29.4	N13 52.4	36 42.9	S10 31.7	51 45.4	31.7	Regulus	207 36.0	N11 51.3
	07	30 58.7	244 03.5	39.7	239 45.6	13 00.0	352 31.4	52.5	51 45.4	31.7	66 48.0	31.7	Rigel	281 05.4	S 8 10.4
	08	46 01.2	259 05.0	38.9	254 46.6	12 59.5	7 33.5	52.6	66 48.0	31.7	81 50.5	31.8	Rigil Kent.	139 41.7	S60 56.1
	09	61 03.6	274 06.4	38.2	269 47.6	12 58.9	22 35.6	52.8	81 50.5	31.8	96 53.0	31.8	Sabik	102 03.9	S15 45.2
	10	76 06.1	289 07.9	37.4	284 48.6	58.4	37 37.7	52.9	96 53.0	31.8	111 55.6	31.9			
	11	91 08.6	304 09.4	36.6	299 49.6	57.8	52 39.7	53.0	111 55.6	31.9	126 58.1	S10 31.9	Schedar	349 32.4	N56 39.7
	12	106 11.0	319 10.8	N12 35.8	314 50.7	N12 57.3	67 41.8	N13 53.1	126 58.1	S10 31.9	142 00.7	31.9	Shaula	96 11.7	S37 07.3
	13	121 13.5	334 12.3	35.1	329 51.7	56.7	82 43.9	53.2	142 00.7	31.9	157 03.2	32.0	Sirius	258 27.7	S16 44.8
	14	136 16.0	349 13.8	34.3	344 52.7	56.2	97 45.9	53.3	157 03.2	32.0	172 05.7	32.0	Spica	158 23.6	S11 17.0
	15	151 18.4	4 15.3	33.5	359 53.7	55.6	112 48.0	53.5	172 05.7	32.0	187 08.3	32.1	Suhail	222 47.6	S43 31.7
	16	166 20.9	19 16.8	32.7	14 54.7	55.1	127 50.1								

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise						
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	6	7	8	9		
	°	'		°	'							°						'	h
d h	° <td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td>	° <td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td>	' <td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td>	h <td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td>	m <td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td>	h <td>m<td>h<td>m<td>h<td>m</td></td></td></td></td>	m <td>h<td>m<td>h<td>m</td></td></td></td>	h <td>m<td>h<td>m</td></td></td>	m <td>h<td>m</td></td>	h <td>m</td>	m	
6	00	178	49.8	N22	43.9	320	35.9	6.3	S19	37.8	13.0	60.7	N 72	00 56	00 52	(00 23)	(01 23)	22 49	
	01	193	49.7		43.7	335	01.2	6.5	19	24.8	13.0	60.7	N 70	01 44	(00 26)	23 22	22 55		
	02	208	49.6		43.5	349	26.7	6.6	19	11.8	13.2	60.7	68	00 47	(00 03)	23 20	23 01		
	03	223	49.5		43.2	3	52.3	6.7	18	58.6	13.2	60.7	66	00 56	(00 13)	23 33	23 19		
	04	238	49.4		43.0	18	18.0	6.8	18	45.4	13.4	60.7	64	01 53	23 36	23 26	23 18		
	05	253	49.3		42.7	32	43.8	6.9	18	32.0	13.5	60.7	62	02 26	23 24	23 21	23 17		
	06	268	49.2	N22	42.5	47	09.7	7.1	S18	18.5	13.7	60.6	60	02 49	23 15	23 16	23 16		
	07	283	49.1		42.2	61	35.8	7.1	18	04.8	13.7	60.6	N 58	01 58	23 08	23 11	23 15		
	08	298	48.9		42.0	76	01.9	7.3	17	51.1	13.8	60.6	56	02 24	22 59	23 07	23 14		
	09	313	48.8		41.7	90	28.2	7.4	17	37.3	13.9	60.6	54	03 02	22 52	23 04	23 21		
T H U R S D A Y	10	328	48.7		41.5	104	54.6	7.5	17	23.4	14.0	60.6	52	03 16	22 46	23 01	23 13		
	11	343	48.6		41.2	119	21.1	7.6	17	09.4	14.2	60.6	50	03 59	22 40	22 58	23 13		
	12	358	48.5	N22	41.0	133	47.7	7.7	S16	55.2	14.2	60.6	45	04 21	22 28	22 51	23 12		
	13	13	48.4		40.7	148	14.4	7.9	16	41.0	14.3	60.5	N 40	04 38	22 18	22 46	23 11		
	14	28	48.3		40.5	162	41.3	7.9	16	26.7	14.4	60.5	35	04 52	22 09	22 41	23 10		
	15	43	48.2		40.2	177	08.2	8.1	16	12.3	14.5	60.5	30	05 05	22 02	22 37	23 09		
	16	58	48.1		40.0	191	35.3	8.1	15	57.8	14.5	60.5	20	05 26	21 49	22 30	23 08		
	17	73	48.0		39.7	206	02.4	8.3	15	43.3	14.7	60.5	N 10	05 21	21 37	22 24	23 07		
	18	88	47.9	N22	39.5	220	29.7	8.4	S15	28.6	14.7	60.4	0	05 39	21 26	22 18	23 06		
	19	103	47.8		39.2	234	57.1	8.5	15	13.9	14.9	60.4	S 10	05 55	21 15	22 12	23 05		
F R I D A Y	20	118	47.7		38.9	249	24.6	8.6	14	59.0	14.9	60.4	20	06 12	21 03	22 05	23 04		
	21	133	47.6		38.7	263	52.2	8.7	14	44.1	14.9	60.4	30	06 30	20 50	21 58	23 03		
	22	148	47.5		38.4	278	19.9	8.8	14	29.2	15.1	60.4	35	06 40	20 42	21 54	23 02		
	23	163	47.4		38.2	292	47.7	8.9	14	14.1	15.1	60.3	40	06 51	20 33	21 49	23 01		
	00	178	47.3	N22	37.9	307	15.6	9.0	S13	59.0	15.2	60.3	45	07 04	20 22	21 43	23 01		
	01	193	47.2		37.6	321	43.6	9.1	13	43.8	15.3	60.3	S 50	07 07	20 10	21 37	23 00		
	02	208	47.1		37.4	336	11.7	9.2	13	28.5	15.3	60.3	52	07 27	20 04	21 33	22 59		
	03	223	47.0		37.1	350	39.9	9.3	13	13.2	15.4	60.3	54	07 34	19 57	21 30	22 59		
	04	238	46.9		36.9	5	08.2	9.5	12	57.8	15.4	60.2	56	07 43	19 49	21 26	22 58		
	05	253	46.8		36.6	19	36.7	9.5	12	42.4	15.5	60.2	58	07 52	19 41	21 22	22 57		
S A T U R D A Y	06	268	46.7	N22	36.3	34	05.2	9.6	S12	26.9	15.6	60.2	S 60	08 03	19 31	21 17	22 57		
	07	283	46.6		36.1	48	33.8	9.7	12	11.3	15.6	60.2		08 07	19 21	21 12	22 56		
	08	298	46.5		35.8	63	02.5	9.7	11	55.7	15.7	60.2	Lat.	Sunset	Twilight		Moonset		
	09	313	46.4		35.5	77	31.2	9.9	11	40.0	15.7	60.1			Civil	Naut.	6	7	
	10	328	46.3		35.3	92	00.1	10.0	11	24.3	15.8	60.1					8	9	
	11	343	46.2		35.0	106	29.1	10.1	11	08.5	15.9	60.1							
	12	358	46.1	N22	34.7	120	58.2	10.1	S10	52.6	15.8	60.1	N 72	06 56	06 56	09 34	11 54		
	13	13	46.0		34.5	135	27.3	10.3	10	36.8	15.9	60.0	N 70	07 20	07 20	09 42	11 51		
	14	28	45.9		34.2	149	56.6	10.3	10	20.9	16.0	60.0	68	07 38	07 38	09 48	11 49		
	15	43	45.8		33.9	164	25.9	10.4	10	04.9	16.0	60.0	66	07 53	07 52	09 53	11 47		
S U N D A Y	16	58	45.7		33.7	178	55.3	10.5	9	48.9	16.1	60.0	64	08 08	08 04	09 58	11 45		
	17	73	45.6		33.4	193	24.8	10.6	9	32.8	16.0	59.9	62	08 17	08 14	10 02	11 44		
	18	88	45.5	N22	33.1	207	54.4	10.6	S 9	16.8	16.1	59.9	60	08 22	08 22	10 05	11 43		
	19	103	45.4		32.8	222	24.0	10.7	9	00.7	16.2	59.9	N 58	08 30	08 29	10 08	11 42		
	20	118	45.3		32.6	236	53.7	10.9	8	44.5	16.2	59.9	56	08 36	08 36	10 10	11 41		
	21	133	45.2		32.3	251	23.6	10.8	8	28.3	16.2	59.8	54	08 42	08 42	10 13	11 40		
	22	148	45.1		32.0	265	53.4	11.0	8	12.1	16.2	59.8	52	08 47	08 47	10 15	11 39		
	23	163	45.0		31.8	280	23.4	11.0	7	55.9	16.3	59.8	50	08 51	08 51	10 16	11 38		
	00	178	44.9	N22	31.5	294	53.4	11.2	S 7	39.6	16.3	59.7	45	08 57	08 57	10 17	11 37		
	01	193	44.8		31.2	309	23.6	11.1	7	23.3	16.3	59.7	N 40	09 01	09 01	10 18	11 36		
02	208	44.7		30.9	323	53.7	11.3	7	07.0	16.3	59.7	35	09 06	09 06	10 19	11 35			
03	223	44.6		30.6	338	24.0	11.3	6	50.7	16.4	59.7	30	09 11	09 11	10 20	11 34			
04	238	44.5		30.4	352	54.3	11.4	6	34.3	16.3	59.6	20	09 16	09 16	10 21	11 33			
05	253	44.4		30.1	7	24.7	11.4	6	18.0	16.4	59.6	N 10	09 21	09 21	10 22	11 32			
06	268	44.3	N22	29.8	21	55.1	11.6	S 6	01.6	16.4	59.6	0	09 26	09 26	10 23	11 31			
07	283	44.2		29.5	36	25.7	11.5	5	45.2	16.4	59.5	S 10	09 31	09 31	10 24	11 30			
08	298	44.1		29.2	50	56.2	11.7	5	28.8	16.5	59.5	20	09 36	09 36	10 25	11 29			
09	313	44.0		29.0	65	26.9	11.7	5	12.3	16.4	59.5	30	09 41	09 41	10 26	11 28			
10	328	43.9		28.7	79	57.6	11.7	4	55.9	16.5	59.5	35	09 46	09 46	10 27	11 27			
11	343	43.8		28.4	94	28.3	11.9	4	39.4	16.4	59.4	40	09 51	09 51	10 28	11 26			
12	358	43.7	N22	28.1	108	59.2	11.8	S 4	23.0	16.5	59.4	45	09 56	09 56	10 29	11 25			
13	13	43.6		27.8	123	30.0	12.0	4	06.5	16.4	59.4	S 50	10 01	10 01	10 30	11 24			
14	28	43.5		27.5	138	01.0	11.9	3	50.1	16.5	59.3	52	10 06	10 06	10 31	11 23			
15	43	43.4		27.3	152	31.9	12.1	3	33.6	16.5	59.3	54	10 11	10 11	10 32	11 22			
16	58	43.3		27.0	167	03.0	12.1	3	17.1	16.4	59.3	56	10 16	10 16	10 33	11 21			
17	73	43.2		26.7	181	34.1	12.1	3	00.7	16.5	59.3	58	10 21	10 21	10 34	11 20			
18	88	43.2	N22	26.4	196	05.2	12.2	S 2	44.2	16.4	59.2	S 60	10 26	10 26	10 35	11 19			
19	103	43.1		26.1	210	36.4	12.2	2	27.8	16.5	59.2		10 31	10 31	10 36	11 18			
20	118	43.0		25.8	225	07.6	12.3	2	11.3	16.4	59.2	Day	Eqn. of Time	Mer.	Mer. Pass.		Age	Phase	
21	133	42.9		25.5	239	38.9	12.3	1	54.9	16.5	59.1		00 ^h	12 ^h	Pass.	Upper			Lower
22	148	42.8		25.2	254	10.2	12.3	S 1	38.4	16.4	59.1	d	m s	m s	h m	h m	h m	d	%
23	163	42.7		24.9	268	41.5	12.4	S 1	22.0	16.4	59.1	6	04 41	04 46	12 05	02 44	15 12	18	87
		SD	15.8	d	0.3	SD	16.5	16.4	16.2			7	04 51	04 55	12 05	03 39	16 04	19	78
												8	05 00	05 05	12 05	04 29	16 54	20	68

UT	ARIES			VENUS -4.7			MARS +1.7			JUPITER -2.2			SATURN +0.6			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
SUNDAY	900	286 40.6	139 28.7 N12 26.6	135 02.8 N12 50.7	248 06.7 N13 54.5	307 28.6 S10 32.4	Acamar	315 12.9 S40 12.4										
	01	301 43.1	154 30.2 25.8	150 03.9 50.1	263 08.7 54.6	322 31.1 32.4	Achernar	335 21.2 S57 06.8										
	02	316 45.5	169 31.7 25.0	165 04.9 49.6	278 10.8 54.8	337 33.7 32.5	Acrux	173 01.6 S63 14.0										
	03	331 48.0	184 33.2 . 24.3	180 05.9 . 49.0	293 12.9 . 54.9	352 36.2 . 32.5	Adhara	255 07.2 S29 00.2										
	04	346 50.5	199 34.8 23.5	195 06.9 48.5	308 15.0 55.0	7 38.8 32.5	Aldebaran	290 41.3 N16 33.4										
	05	1 52.9	214 36.3 22.7	210 07.9 47.9	323 17.0 55.1	22 41.3 32.6												
	06	16 55.4	229 37.8 N12 21.9	225 08.9 N12 47.4	338 19.1 N13 55.2	37 43.8 S10 32.6	Alioth	166 14.1 N55 50.3										
	07	31 57.9	244 39.3 21.2	240 09.9 46.8	353 21.2 55.3	52 46.4 32.7	Alkaid	152 52.9 N49 12.1										
	08	47 00.3	259 40.9 20.4	255 11.0 46.3	8 23.3 55.5	67 48.9 32.7	Alnair	27 34.1 S46 50.7										
	09	62 02.8	274 42.4 . 19.6	270 12.0 . 45.7	23 25.3 . 55.6	82 51.5 . 32.7	Alnilam	275 39.3 S 1 11.2										
	10	77 05.2	289 43.9 18.9	285 13.0 45.2	38 27.4 55.7	97 54.0 32.8	Alphard	217 49.3 S 8 45.6										
	11	92 07.7	304 45.5 18.1	300 14.0 44.6	53 29.5 55.8	112 56.5 32.8												
	12	107 10.2	319 47.0 N12 17.3	315 15.0 N12 44.0	68 31.6 N13 55.9	127 59.1 S10 32.9	Alphecca	126 04.6 N26 38.3										
	13	122 12.6	334 48.5 16.6	330 16.0 43.5	83 33.6 56.1	143 01.6 32.9	Alpheratz	357 36.0 N29 13.0										
	14	137 15.1	349 50.1 15.8	345 17.0 42.9	98 35.7 56.2	158 04.2 32.9	Altair	62 00.8 N 8 55.8										
	15	152 17.6	4 51.6 . 15.0	0 18.1 . 42.4	113 37.8 . 56.3	173 06.7 . 33.0	Ankaa	353 08.3 S42 10.5										
	16	167 20.0	19 53.2 14.3	15 19.1 41.8	128 39.9 56.4	188 09.3 33.0	Antares	112 17.1 S26 29.1										
	17	182 22.5	34 54.7 13.5	30 20.1 41.3	143 41.9 56.5	203 11.8 33.1												
	18	197 25.0	49 56.3 N12 12.7	45 21.1 N12 40.7	158 44.0 N13 56.6	218 14.3 S10 33.1	Arcturus	145 48.9 N19 03.8										
	19	212 27.4	64 57.8 12.0	60 22.1 40.2	173 46.1 56.7	233 16.9 33.1	Atria	107 11.9 S69 04.3										
	20	227 29.9	79 59.4 11.2	75 23.1 39.6	188 48.2 56.9	248 19.4 33.2	Avior	234 15.9 S59 35.1										
	21	242 32.3	95 01.0 . 10.5	90 24.2 . 39.1	203 50.3 . 57.0	263 22.0 . 33.2	Bellatrix	278 24.5 N 6 22.3										
	22	257 34.8	110 02.5 09.7	105 25.2 38.5	218 52.3 57.1	278 24.5 33.3	Betelgeuse	270 53.8 N 7 24.7										
	23	272 37.3	125 04.1 08.9	120 26.2 37.9	233 54.4 57.2	293 27.1 . 33.3												
	MONDAY	00	287 39.7	140 05.7 N12 08.2	135 27.2 N12 37.4	248 56.5 N13 57.3	308 29.6 S10 33.3	Canopus	263 53.5 S52 42.4									
01		302 42.2	155 07.3 07.4	150 28.2 36.8	263 58.6 57.4	323 32.2 33.4	Capella	280 24.2 N46 01.2										
02		317 44.7	170 08.8 06.7	165 29.2 36.3	279 00.7 57.6	338 34.7 33.4	Deneb	49 26.2 N45 21.7										
03		332 47.1	185 10.4 . 05.9	180 30.2 . 35.7	294 02.7 . 57.7	353 37.2 . 33.5	Denebola	182 26.3 N14 26.6										
04		347 49.6	200 12.0 05.1	195 31.3 35.2	309 04.8 57.8	8 39.8 33.5	Diphda	348 48.5 S17 51.4										
05		2 52.1	215 13.6 04.4	210 32.3 34.6	324 06.9 57.9	23 42.3 33.5												
06		17 54.5	230 15.2 N12 03.6	225 33.3 N12 34.1	339 09.0 N13 58.0	38 44.9 S10 33.6	Dubhe	193 42.9 N61 37.8										
07		32 57.0	245 16.8 02.9	240 34.3 33.5	354 11.0 58.1	53 47.4 33.6	Elnath	278 03.8 N28 37.6										
08		47 59.5	260 18.4 02.1	255 35.3 32.9	9 13.1 58.3	68 50.0 33.7	Eltanin	90 42.2 N51 29.2										
09		63 01.9	275 20.0 . 01.3	270 36.3 . 32.4	24 15.2 . 58.4	83 52.5 . 33.7	Enif	33 39.8 N 9 58.9										
10		78 04.4	290 21.6 12 00.6	285 37.4 31.8	39 17.3 58.5	98 55.1 33.7	Fomalhaut	15 15.7 S29 29.7										
11		93 06.8	305 23.2 11 59.8	300 38.4 31.3	54 19.4 58.6	113 57.6 33.8												
12		108 09.3	320 24.8 N11 59.1	315 39.4 N12 30.7	69 21.4 N13 58.7	129 00.1 S10 33.8	Gacrux	171 53.1 S57 14.9										
13		123 11.8	335 26.4 58.3	330 40.4 30.2	84 23.5 58.8	144 02.7 33.9	Gienah	175 44.9 S17 40.4										
14		138 14.2	350 28.0 57.6	345 41.4 29.6	99 25.6 58.9	159 05.2 33.9	Hadar	148 37.6 S60 29.4										
15		153 16.7	5 29.6 . 56.8	0 42.4 . 29.0	114 27.7 . 59.1	174 07.8 . 34.0	Hamal	327 52.7 N23 34.3										
16		168 19.2	20 31.3 56.0	15 43.5 28.5	129 29.8 59.2	189 10.3 34.0	Kaus Aust.	83 33.8 S34 22.4										
17		183 21.6	35 32.9 55.3	30 44.5 27.9	144 31.9 59.3	204 12.9 34.0												
18		198 24.1	50 34.5 N11 54.5	45 45.5 N12 27.4	159 33.9 N13 59.4	219 15.4 S10 34.1	Kochab	137 19.2 N74 03.8										
19		213 26.6	65 36.1 53.8	60 46.5 26.8	174 36.0 59.5	234 18.0 34.1	Markab	13 31.0 N15 19.8										
20		228 29.0	80 37.8 53.0	75 47.5 26.3	189 38.1 59.6	249 20.5 34.2	Menkar	314 07.6 N 4 10.9										
21		243 31.5	95 39.4 . 52.3	90 48.5 . 25.7	204 40.2 . 59.7	264 23.1 . 34.2	Menkent	147 59.0 S36 29.3										
22		258 34.0	110 41.1 51.5	105 49.6 25.1	219 42.3 13 59.9	279 25.6 34.2	Miaplacidus	221 39.4 S69 48.9										
23		273 36.4	125 42.7 50.8	120 50.6 24.6	234 44.3 14 00.0	294 28.2 34.3												
TUESDAY		00	288 38.9	140 44.3 N11 50.0	135 51.6 N12 24.0	249 46.4 N14 00.1	309 30.7 S10 34.3	Mirfak	308 30.3 N49 56.5									
	01	303 41.3	155 46.0 49.3	150 52.6 23.5	264 48.5 00.2	324 33.3 34.4	Nunki	75 48.9 S26 16.0										
	02	318 43.8	170 47.6 48.5	165 53.6 22.9	279 50.6 00.3	339 35.8 34.4	Peacock	53 07.1 S56 39.5										
	03	333 46.3	185 49.3 . 47.8	180 54.6 . 22.3	294 52.7 . 00.4	354 38.4 . 34.5	Pollux	243 19.2 N27 58.2										
	04	348 48.7	200 51.0 47.0	195 55.6 21.8	309 54.8 00.5	9 40.9 34.5	Procyon	244 52.5 N 5 10.0										
	05	3 51.2	215 52.6 46.3	210 56.7 21.2	324 56.8 00.7	24 43.4 34.5												
	06	18 53.7	230 54.3 N11 45.5	225 57.7 N12 20.7	339 58.9 N14 00.8	39 46.0 S10 34.6	Rasalhague	95 59.4 N12 32.6										
	07	33 56.1	245 55.9 44.8	240 58.7 20.1	355 01.0 00.9	54 48.5 34.6	Regulus	207 36.0 N11 51.3										
	08	48 58.6	260 57.6 44.0	255 59.7 19.5	10 03.1 01.0	69 51.1 34.7	Rigel	281 05.4 S 8 10.4										
	09	64 01.1	275 59.3 . 43.3	271 00.7 . 19.0	25 05.2 . 01.1	84 53.6 . 34.7	Rigel Kent.	139 41.8 S60 56.1										
	10	79 03.5	291 01.0 42.5	286 01.7 18.4	40 07.3 01.2	99 56.2 34.8	Sabik	102 03.9 S15 45.2										
	11	94 06.0	306 02.6 41.8	301 02.8 17.9	55 09.4 01.3	114 58.7 34.8												
	12	109 08.4	321 04.3 N11 41.1	316 03.8 N12 17.3	70 11.4 N14 01.4	130 01.3 S10 34.8	Schedar	349 32.4 N56 39.7										
	13	124 10.9	336 06.0 40.3	331 04.8 16.7	85 13.5 01.6	145 03.8 34.9	Shaula	96 11.7 S37 07.3										
	14	139 13.4	351 07.7 39.6	346 05.8 16.2	100 15.6 01.7	160 06.4 34.9	Sirius	258 27.7 S16 44.8										
	15	154 15.8	6 09.4 . 38.8	1 06.8 . 15.6	115 17.7 . 01.8	175 08.9 . 35.0	Spica	158 23.6 S11 17.0										
	16	169 18.3	21 11.1 38.1	16 07.8 15.1	130 19.8 01.9	190 11.5 35.0	Suhail	222 47.6 S43 31.7										
	17	184 20.8	36 12.8 37.3	31 08.9 14.5	145 21.9 02.0	205 14.0 35.1												
	18	199 23.2	51 14.5 N11 36.6	46 09.9 N12 13.9	160 24.0 N14 02.1	220 16.6 S10 35.1	Vega	80 33.6 N38 48.3										
	19	214 25.7	66 16.2 35.9	61 10.9 13.4	175 26.0 02.2	235 19.1 35.1	Zuben'ubi	136 57.2 S16 08.4										
	20	229 28.2	81 17.9 35.1	76 11.9 12.8	190 28.1 02.3	250 21.7 35.2												
	21	244 30.6	96 19.6 . 34.4	91 12.9 . 12.3	205 30.2 . 02.5	265 24.2 . 35.2												
	22	259 33.1	111 21.3 33.6	106 13.9 11.7	220 32.3 02.6	280 26.8 35.3	Venus	212 25.9 14 38										
	23	274 35.6	126 23.0 32.9	121 15.0 11.1	235 34.4 02.7	295 29.3 35.3	Mars	207 47.5 14 57										
							Jupiter	321 16.8 7 23										
						Saturn	20 49.9 3 25											
Mer. Pass.	4 48.6	v 1.6 d 0.8	v 1.0 d 0.6	v 2.1 d 0.1	v 2.5 d 0.0													

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	°	Dec	d	HP	Naut.		Civil	9		10	11	12	
d h	°	'	°	'	°	'	'	°	h m	h m	h m	h m	h m	h m	h m	h m
SUNDAY	9 00	178 42.6	N22 24.7	283 12.9	12.4	S 1 05.6	16.4	59.0	N 72				22 49	22 09	21 07	
	01	193 42.5	24.4	297 44.3	12.5	0 49.2	16.4	59.0	N 70				22 55	22 26	21 46	
	02	208 42.4	24.1	312 15.8	12.5	0 32.8	16.4	59.0	68				23 01	22 40	22 14	21 25
	03	223 42.3	23.8	326 47.3	12.5	S 0 16.4	16.4	59.0	66	////	////	01 11	23 06	22 52	22 35	22 10
	04	238 42.2	23.5	341 18.8	12.6	0 00.0	16.3	58.9	64	////	////	02 01	23 10	23 01	22 52	22 40
	05	253 42.1	23.2	355 50.4	12.6	N 0 16.3	16.4	58.9	62	////	////	02 31	23 13	23 09	23 06	23 03
	06	268 42.0	N22 22.9	10 22.0	12.6	N 0 32.7	16.3	58.9	60	////	01 28	02 54	23 16	23 16	23 18	23 21
	07	283 41.9	22.6	24 53.6	12.7	0 49.0	16.3	58.8	N 58	////	02 04	03 12	23 19	23 23	23 28	23 36
	08	298 41.8	22.3	39 25.3	12.7	1 05.3	16.2	58.8	56	////	02 29	03 28	23 21	23 28	23 37	23 50
	09	313 41.7	22.0	53 57.0	12.7	1 21.5	16.3	58.8	54	01 21	02 49	03 41	23 23	23 33	23 45	24 01
	10	328 41.6	21.7	68 28.7	12.8	1 37.8	16.2	58.7	52	01 54	03 05	03 52	23 25	23 38	23 53	24 11
	11	343 41.6	21.4	83 00.5	12.7	1 54.0	16.2	58.7	50	02 18	03 19	04 02	23 27	23 42	23 59	24 20
	12	358 41.5	N22 21.1	97 32.2	12.8	N 2 10.2	16.1	58.7	45	02 59	03 47	04 23	23 31	23 51	24 14	00 14
	13	13 41.4	20.8	112 04.0	12.8	2 26.3	16.2	58.6	N 40	03 27	04 08	04 40	23 35	23 59	24 25	00 25
	14	28 41.3	20.5	126 35.8	12.8	2 42.5	16.1	58.6	35	03 49	04 25	04 54	23 38	24 06	00 06	00 36
	15	43 41.2	20.2	141 07.6	12.9	2 58.6	16.0	58.6	30	04 06	04 39	05 06	23 40	24 11	00 11	00 44
	16	58 41.1	19.9	155 39.5	12.8	3 14.6	16.1	58.6	N 20	04 34	05 03	05 27	23 45	24 22	00 22	01 00
	17	73 41.0	19.6	170 11.3	12.9	3 30.7	16.0	58.5	0	04 55	05 22	05 45	23 49	24 31	00 31	01 14
	18	88 40.9	N22 19.3	184 43.2	12.9	N 3 46.7	15.9	58.5	S 10	05 13	05 39	06 02	23 53	24 39	00 39	01 26
	19	103 40.8	19.0	199 15.1	12.9	4 02.6	16.0	58.5	20	05 29	05 56	06 18	23 57	24 48	00 48	01 39
	20	118 40.7	18.7	213 47.0	12.9	4 18.6	15.9	58.4	S 10	05 45	06 12	06 36	24 01	00 01	00 57	01 53
	21	133 40.6	18.4	228 18.9	12.9	4 34.5	15.8	58.4	30	06 00	06 30	06 56	24 06	00 06	01 07	02 09
	22	148 40.5	18.1	242 50.8	13.0	4 50.3	15.8	58.4	35	06 08	06 40	07 07	24 08	00 08	01 14	02 19
	23	163 40.5	17.8	257 22.8	12.9	5 06.1	15.8	58.3	40	06 17	06 51	07 21	24 12	00 12	01 21	02 29
	MONDAY	00	178 40.4	N22 17.4	271 54.7	13.0	N 5 21.9	15.8	58.3	45	06 26	07 03	07 36	24 15	00 15	01 29
01		193 40.3	17.1	286 26.7	12.9	5 37.7	15.6	58.3	S 50	06 37	07 18	07 56	24 20	00 20	01 39	02 58
02		208 40.2	16.8	300 58.6	13.0	5 53.3	15.7	58.2	52	06 42	07 25	08 05	24 22	00 22	01 44	03 05
03		223 40.1	16.5	315 30.6	12.9	6 09.0	15.6	58.2	54	06 47	07 32	08 15	24 24	00 24	01 49	03 13
04		238 40.0	16.2	330 02.5	13.0	6 24.6	15.6	58.2	56	06 53	07 41	08 27	24 27	00 27	01 55	03 22
05		253 39.9	15.9	344 34.5	12.9	6 40.2	15.5	58.2	S 58	06 59	07 50	08 40	24 30	00 30	02 01	03 33
06		268 39.8	N22 15.6	359 06.4	13.0	N 6 55.7	15.4	58.1	S 60	07 05	08 01	08 56	24 33	00 33	02 08	03 45
07		283 39.7	15.3	13 38.4	13.0	7 11.1	15.4	58.1	Lat.	Sunset	Twilight		Moonset			
08		298 39.7	15.0	28 10.4	12.9	7 26.5	15.4	58.1	Civil	Naut.	9	10	11	12		
09		313 39.6	14.6	42 42.3	13.0	7 41.9	15.3	58.0	h m	h m	h m	h m	h m	h m	h m	h m
10		328 39.5	14.3	57 14.3	12.9	7 57.2	15.2	58.0	N 72				11 54	14 14	16 56	
11		343 39.4	14.0	71 46.2	12.9	8 12.4	15.2	58.0	N 70				11 51	13 59	16 19	
12		358 39.3	N22 13.7	86 18.1	13.0	N 8 27.6	15.2	57.9	68				11 49	13 48	15 53	18 23
13		13 39.2	13.4	100 50.1	12.9	8 42.8	15.1	57.9	66	22 56	////	////	11 47	13 39	15 33	17 39
14		28 39.1	13.1	115 22.0	12.9	8 57.9	15.0	57.9	64	22 08	////	////	11 45	13 31	15 18	17 10
15		43 39.0	12.7	129 53.9	12.9	9 12.9	15.0	57.8	62	21 38	////	////	11 44	13 24	15 05	16 49
16		58 38.9	12.4	144 25.8	12.9	9 27.9	14.9	57.8	60	21 16	22 40	////	11 43	13 18	14 54	16 31
17		73 38.9	12.1	158 57.7	12.8	9 42.8	14.8	57.8	N 58	20 57	22 05	////	11 42	13 13	14 44	16 16
18		88 38.8	N22 11.8	173 29.5	12.9	N 9 57.6	14.8	57.8	56	20 42	21 40	////	11 41	13 09	14 36	16 04
19		103 38.7	11.5	188 01.4	12.8	10 12.4	14.7	57.7	54	20 29	21 21	22 48	11 40	13 05	14 29	15 53
20		118 38.6	11.1	202 33.2	12.8	10 27.1	14.7	57.7	52	20 18	21 05	22 15	11 39	13 01	14 22	15 43
21		133 38.5	10.8	217 05.0	12.8	10 41.8	14.6	57.7	50	20 08	20 51	21 51	11 38	12 58	14 17	15 35
22		148 38.4	10.5	231 36.8	12.8	10 56.4	14.5	57.6	45	19 47	20 24	21 11	11 37	12 51	14 04	15 17
23		163 38.3	10.2	246 08.6	12.8	11 10.9	14.5	57.6	N 40	19 30	20 03	20 43	11 35	12 45	13 54	15 02
TUESDAY		00	178 38.3	N22 09.9	260 40.4	12.7	N11 25.4	14.4	57.6	35	19 16	19 46	20 22	11 34	12 40	13 45
	01	193 38.2	09.5	275 12.1	12.8	11 39.8	14.3	57.5	30	19 04	19 31	20 04	11 33	12 35	13 37	14 39
	02	208 38.1	09.2	289 43.9	12.7	11 54.1	14.3	57.5	20	18 43	19 08	19 37	11 31	12 28	13 24	14 20
	03	223 38.0	08.9	304 15.6	12.6	12 08.4	14.2	57.5	N 10	18 26	18 48	19 15	11 30	12 21	13 12	14 04
	04	238 37.9	08.5	318 47.2	12.7	12 22.6	14.1	57.5	0	18 09	18 31	18 57	11 28	12 15	13 01	13 50
	05	253 37.8	08.2	333 18.9	12.6	12 36.7	14.0	57.4	S 10	17 53	18 15	18 41	11 27	12 08	12 51	13 35
	06	268 37.7	N22 07.9	347 50.5	12.6	N12 50.7	14.0	57.4	20	17 35	17 59	18 26	11 25	12 02	12 39	13 19
	07	283 37.7	07.6	2 22.1	12.6	13 04.7	13.9	57.4	30	17 15	17 41	18 11	11 23	11 54	12 26	13 01
	08	298 37.6	07.2	16 53.7	12.5	13 18.6	13.8	57.3	35	17 04	17 31	18 03	11 22	11 50	12 19	12 50
	09	313 37.5	06.9	31 25.2	12.5	13 32.4	13.7	57.3	40	16 50	17 20	17 54	11 21	11 45	12 10	12 39
	10	328 37.4	06.6	45 56.7	12.5	13 46.1	13.7	57.3	45	16 35	17 08	17 45	11 20	11 40	12 01	12 25
	11	343 37.3	06.2	60 28.2	12.4	13 59.8	13.6	57.2	S 50	16 15	16 53	17 34	11 18	11 33	11 49	12 08
	12	358 37.2	N22 05.9	74 59.6	12.4	N14 13.4	13.5	57.2	52	16 06	16 46	17 29	11 17	11 30	11 43	12 00
	13	13 37.1	05.6	89 31.0	12.4	14 26.9	13.4	57.2	54	15 56	16 39	17 24	11 17	11 26	11 37	11 51
	14	28 37.1	05.2	104 02.4	12.4	14 40.3	13.3	57.2	56	15 44	16 30	17 18	11 16	11 23	11 31	11 41
	15	43 37.0	04.9	118 33.8	12.3	14 53.6	13.3	57.1	58	15 31	16 21	17 12	11 15	11 19	11 23	11 29
	16	58 36.9	04.6	133 05.1	12.3	15 06.9	13.2	57.1	S 60	15 15	16 10	17 06	11 14	11 14	11 15	11 17
	17	73 36.8	04.2	147 36.4	12.2	15 20.1	13.1	57.1	SUN		MOON					
	18	88 36.7	N22 03.9	162 07.6	12.2	N15 33.2	13.0	57.0	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase
	19	103 36.7	03.6	176 38.8	12.2	15 46.2	12.9	57.0	00 ^h	12 ^h	Pass.	Upper	Lower			
	20	118 36.6	03.2	191 10.0	12.1	15 59.1	12.8	57.0	d	m s	m s	h m	h m	h m	d	%
	21	133 36.5	02.9	205 41.1	12.1	16 11.9	12.7	57.								

UT	ARIES	VENUS	-4.7	MARS	+1.8	JUPIER	-2.3	SATURN	+0.6	STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
WEDNESDAY	289 38.0	141 24.7	N11 32.2	136 16.0	N12 10.6	250 36.5	N14 02.8	310 31.9	S10 35.4	Acamar	315 12.9	S40 12.4
	304 40.5	156 26.5	31.4	151 17.0	10.0	265 38.6	02.9	325 34.4	35.4	Achernar	335 21.2	S57 06.8
	319 42.9	171 28.2	30.7	166 18.0	09.4	280 40.7	03.0	340 37.0	35.4	Acruz	173 01.6	S63 14.0
	334 45.4	186 29.9	29.9	181 19.0	08.9	295 42.7	03.1	355 39.5	35.5	Adhara	255 07.2	S29 00.1
	349 47.9	201 31.6	29.2	196 20.1	08.3	310 44.8	03.2	10 42.1	35.5	Aldebaran	290 41.3	N16 33.4
	4 50.3	216 33.4	28.5	211 21.1	07.8	325 46.9	03.4	25 44.7	35.6			
	19 52.8	231 35.1	N11 27.7	226 22.1	N12 07.2	340 49.0	N14 03.5	40 47.2	S10 35.6	Alioth	166 14.1	N55 50.3
	34 55.3	246 36.8	27.0	241 23.1	06.6	355 51.1	03.6	55 49.8	35.7	Alkaid	152 52.9	N49 12.1
	49 57.7	261 38.6	26.3	256 24.1	06.1	10 53.2	03.7	70 52.3	35.7	Alnair	27 34.1	S46 50.1
	65 00.2	276 40.3	25.5	271 25.1	05.5	25 55.3	03.8	85 54.9	35.7	Alnilam	275 39.3	S 1 11.1
	80 02.7	291 42.1	24.8	286 26.2	04.9	40 57.4	03.9	100 57.4	35.8	Alphard	217 49.3	S 8 45.6
	95 05.1	306 43.8	24.1	301 27.2	04.4	55 59.5	04.0	116 00.0	35.8			
	110 07.6	321 45.6	N11 23.3	316 28.2	N12 03.8	71 01.6	N14 04.1	131 02.5	S10 35.9	Alphecca	126 04.6	N26 38.3
	125 10.1	336 47.3	22.6	331 29.2	03.2	86 03.6	04.2	146 05.1	35.9	Alpheratz	357 35.9	N29 13.1
	140 12.5	351 49.1	21.9	346 30.2	02.7	101 05.7	04.4	161 07.6	36.0	Altair	62 00.8	N 8 55.8
	155 15.0	6 50.9	21.1	1 31.2	02.1	116 07.8	04.5	176 10.2	36.0	Ankaa	353 08.3	S42 10.5
	170 17.4	21 52.6	20.4	16 32.3	01.6	131 09.9	04.6	191 12.7	36.1	Antares	112 17.1	S26 29.1
	185 19.9	36 54.4	19.7	31 33.3	01.0	146 12.0	04.7	206 15.3	36.1			
	200 22.4	51 56.2	N11 19.0	46 34.3	N12 00.4	161 14.1	N14 04.8	221 17.8	S10 36.1	Arcturus	145 49.0	N19 03.8
	215 24.8	66 58.0	18.2	61 35.3	11 59.9	176 16.2	04.9	236 20.4	36.2	Atria	107 11.9	S69 04.3
	230 27.3	81 59.7	17.5	76 36.3	59.3	191 18.3	05.0	251 22.9	36.2	Avior	234 15.9	S59 35.1
	245 29.8	97 01.5	16.8	91 37.3	58.7	206 20.4	05.1	266 25.5	36.3	Bellatrix	278 24.5	N 6 22.3
	260 32.2	112 03.3	16.0	106 38.4	58.2	221 22.5	05.2	281 28.1	36.3	Betelgeuse	270 53.7	N 7 24.7
275 34.7	127 05.1	15.3	121 39.4	57.6	236 24.6	05.4	296 30.6	36.4				
THURSDAY	290 37.2	142 06.9	N11 14.6	136 40.4	N11 57.0	251 26.7	N14 05.5	311 33.2	S10 36.4	Canopus	263 53.5	S52 42.3
	305 39.6	157 08.7	13.9	151 41.4	56.5	266 28.7	05.6	326 35.7	36.5	Capella	280 24.1	N46 01.2
	320 42.1	172 10.5	13.1	166 42.4	55.9	281 30.8	05.7	341 38.3	36.5	Deneb	49 26.2	N45 21.7
	335 44.5	187 12.3	12.4	181 43.5	55.3	296 32.9	05.8	356 40.8	36.5	Denebola	182 26.3	N14 26.6
	350 47.0	202 14.1	11.7	196 44.5	54.8	311 35.0	05.9	11 43.4	36.6	Diphda	348 48.5	S17 51.3
	5 49.5	217 15.9	11.0	211 45.5	54.2	326 37.1	06.0	26 45.9	36.6			
	20 51.9	232 17.7	N11 10.3	226 46.5	N11 53.6	341 39.2	N14 06.1	41 48.5	S10 36.7	Dubhe	193 42.9	N61 37.8
	35 54.4	247 19.5	09.5	241 47.5	53.1	356 41.3	06.2	56 51.0	36.7	Elnath	278 03.8	N28 37.6
	50 56.9	262 21.4	08.8	256 48.5	52.5	11 43.4	06.3	71 53.6	36.8	Eltanin	90 42.2	N51 29.2
	65 59.3	277 23.2	08.1	271 49.6	51.9	26 45.5	06.5	86 56.2	36.8	Enif	33 39.7	N 9 58.9
	81 01.8	292 25.0	07.4	286 50.6	51.4	41 47.6	06.6	101 58.7	36.9	Fomalhaut	15 15.7	S29 29.7
	96 04.3	307 26.8	06.6	301 51.6	50.8	56 49.7	06.7	117 01.3	36.9			
	111 06.7	322 28.7	N11 05.9	316 52.6	N11 50.2	71 51.8	N14 06.8	132 03.8	S10 36.9	Gacrux	171 53.2	S57 14.9
	126 09.2	337 30.5	05.2	331 53.6	49.7	86 53.9	06.9	147 06.4	37.0	Gienah	175 47.6	S17 40.4
	141 11.7	352 32.3	04.5	346 54.6	49.1	101 56.0	07.0	162 08.9	37.0	Hadar	148 37.0	S60 29.4
	156 14.1	7 34.2	03.8	1 55.7	48.5	116 58.1	07.1	177 11.5	37.1	Hamal	327 52.7	N23 34.3
	171 16.6	22 36.0	03.1	16 56.7	48.0	132 00.2	07.2	192 14.0	37.1	Kaus Aust.	83 33.8	S34 22.4
	186 19.0	37 37.9	02.3	31 57.7	47.4	147 02.3	07.3	207 16.6	37.2			
	201 21.5	52 39.7	N11 01.6	46 58.7	N11 46.8	162 04.4	N14 07.4	222 19.2	S10 37.2	Kochab	137 19.3	N74 03.8
	216 24.0	67 41.6	00.9	61 59.7	46.3	177 06.5	07.5	237 21.7	37.3	Markab	13 30.9	N15 19.8
	231 26.4	82 43.4	11 00.2	77 00.8	45.7	192 08.6	07.6	252 24.3	37.3	Menkar	314 07.6	N 4 10.9
	246 28.9	97 45.3	10 59.5	92 01.8	45.1	207 10.6	07.8	267 26.8	37.4	Menkent	147 59.0	S36 29.3
	261 31.4	112 47.2	58.8	107 02.8	44.6	222 12.7	07.9	282 29.4	37.4	Miaplacidus	221 39.4	S69 48.9
276 33.8	127 49.0	58.1	122 03.8	44.0	237 14.8	08.0	297 31.9	37.4				
FRIDAY	291 36.3	142 50.9	N10 57.4	137 04.8	N11 43.4	252 16.9	N14 08.1	312 34.5	S10 37.5	Mirfak	308 30.3	N49 56.5
	306 38.8	157 52.8	56.6	152 05.8	42.8	267 19.0	08.2	327 37.1	37.5	Nunki	75 48.9	S26 16.0
	321 41.2	172 54.6	55.9	167 06.9	42.3	282 21.1	08.3	342 39.6	37.6	Peacock	53 07.1	S56 39.5
	336 43.7	187 56.5	55.2	182 07.9	41.7	297 23.2	08.4	357 42.2	37.6	Pollux	243 19.2	N27 58.2
	351 46.2	202 58.4	54.5	197 08.9	41.1	312 25.3	08.5	12 44.7	37.7	Procyon	244 52.5	N 5 10.0
	6 48.6	218 00.3	53.8	212 09.9	40.6	327 27.4	08.6	27 47.3	37.7			
	21 51.1	233 02.2	N10 53.1	227 10.9	N11 40.0	342 29.5	N14 08.7	42 49.9	S10 37.8	Rasalhague	95 59.4	N12 32.6
	36 53.5	248 04.1	52.4	242 12.0	39.4	357 31.6	08.8	57 52.4	37.8	Regulus	207 36.0	N11 51.3
	51 56.0	263 06.0	51.7	257 13.0	38.9	12 33.7	08.9	72 55.0	37.9	Rigel	281 05.3	S 8 10.4
	66 58.5	278 07.9	51.0	272 14.0	38.3	27 35.8	09.1	87 57.5	37.9	Rigel Kent.	139 41.8	S60 56.1
	82 00.9	293 09.8	50.3	287 15.0	37.7	42 37.9	09.2	103 00.1	38.0	Sabik	102 03.9	S15 45.2
	97 03.4	308 11.7	49.6	302 16.0	37.2	57 40.0	09.3	118 02.7	38.0			
	112 05.9	323 13.6	N10 48.9	317 17.0	N11 36.6	72 42.1	N14 09.4	133 05.2	S10 38.0	Schedar	349 32.4	N56 39.7
	127 08.3	338 15.5	48.2	332 18.1	36.0	87 44.2	09.5	148 07.8	38.1	Shaula	96 11.7	S37 07.3
	142 10.8	353 17.4	47.5	347 19.1	35.4	102 46.3	09.6	163 10.3	38.1	Sirius	258 27.7	S16 44.8
	157 13.3	8 19.3	46.8	2 20.1	34.9	117 48.4	09.7	178 12.9	38.2	Spica	158 23.6	S11 17.0
	172 15.7	23 21.3	46.1	17 21.1	34.3	132 50.5	09.8	193 15.5	38.2	Suhail	222 47.6	S43 31.7
	187 18.2	38 23.2	45.4	32 22.1	33.7	147 52.6	09.9	208 18.0	38.3			
	202 20.7	53 25.1	N10 44.7	47 23.2	N11 33.2	162 54.7	N14 10.0	223 20.6	S10 38.3	Vega	80 33.6	N38 48.4
	217 23.1	68 27.0	44.0	62 24.2	32.6	177 56.8	10.1	238 23.1	38.4	Zuben'ubi	136 57.2	S16 08.4
	232 25.6	83 29.0	43.3	77 25.2	32.0	192 58.9	10.2	253 25.7	38.4		SHA	Mer.Pass.
	247 28.0	98 30.9	42.6	92 26.2	31.4	208 01.0	10.3	268 28.3	38.5		h m	
	262 30.5	113 32.9	41.9	107 27.2	30.9	223 03.1	10.4	283 30.8	38.5	Venus	211 29.7	14 30
277 33.0	128 34.8	41.2	122 28.3	30.3	238 05.2	10.5	298 33.4	38.6	Mars	206 03.2	14 52	
	h m									Jupiter	320 49.5	7 13
Mer.Pass.	4 36.8	v 1.8	d 0.7	v 1.0	d 0.6	v 2.1	d 0.1	v 2.6	d 0.0	Saturn	20 56.0	3 13

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	12		13	14	15	
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m
1200	178 36.2	N22 01.9	249 14.3	11.9	N16 49.9	12.4	56.9	N 72								
	01 193 36.2	01.5	263 45.2	12.0	17 02.3	12.4	56.9	N 70								
	02 208 36.1	01.2	278 16.2	11.9	17 14.7	12.3	56.8	68				21 25				
	03 223 36.0	00.9	292 47.1	11.8	17 27.0	12.2	56.8	66	////	////	01 25	22 10				
	04 238 35.9	00.5	307 17.9	11.8	17 39.2	12.1	56.8	64	////	////	02 09	22 40	22 19			
	05 253 35.8	22 00.2	321 48.7	11.8	17 51.3	12.0	56.7	62	////	00 27	02 38	23 03	23 00	22 59	23 13	
WEDNESDAY	06 268 35.8	N21 59.8	336 19.5	11.7	N18 03.3	11.9	56.7	60	////	01 37	02 59	23 21	23 28	23 44	24 19	
	07 283 35.7	59.5	350 50.2	11.7	18 15.2	11.8	56.7	N 58	00 25	02 34	03 32	23 50	24 08	00 08	00 36	
	08 298 35.6	59.1	5 20.9	11.6	18 27.0	11.7	56.7	54	01 29	02 53	03 44	24 01	00 01	00 23	00 54	
	09 313 35.5	58.8	19 51.5	11.6	18 38.7	11.6	56.6	52	02 00	03 09	03 55	24 11	00 11	00 36	01 10	
	10 328 35.4	58.4	34 22.1	11.5	18 50.3	11.5	56.6	50	02 23	03 22	04 05	24 20	00 20	00 48	01 24	
	11 343 35.4	58.1	48 52.6	11.5	19 01.8	11.4	56.6	45	03 02	03 49	04 26	00 14	00 40	01 12	01 51	
	12 358 35.3	N21 57.7	63 23.1	11.4	N19 13.2	11.3	56.6	N 40	03 30	04 10	04 42	00 25	00 56	01 31	02 13	
	13 13 35.2	57.4	77 53.5	11.4	19 24.5	11.2	56.5	35	03 51	04 27	04 56	00 36	01 09	01 47	02 32	
	14 28 35.1	57.0	92 23.9	11.4	19 35.7	11.1	56.5	30	04 08	04 41	05 08	00 44	01 21	02 02	02 48	
	15 43 35.0	56.7	106 54.3	11.3	19 46.8	10.9	56.5	20	04 35	05 04	05 28	01 00	01 41	02 26	03 14	
	16 58 35.0	56.3	121 24.6	11.2	19 57.7	10.9	56.5	N 10	04 56	05 23	05 46	01 14	01 59	02 47	03 37	
THURSDAY	17 73 34.9	56.0	135 54.8	11.3	20 08.6	10.8	56.4	0	05 14	05 40	06 02	01 26	02 15	03 06	03 59	
	18 88 34.8	N21 55.6	150 25.1	11.1	N20 19.4	10.7	56.4	S 10	05 30	05 56	06 18	01 39	02 32	03 26	04 21	
	19 103 34.7	55.3	164 55.2	11.1	20 30.1	10.5	56.4	20	05 45	06 12	06 35	01 53	02 50	03 47	04 44	
	20 118 34.6	54.9	179 25.3	11.1	20 40.6	10.5	56.4	30	06 00	06 29	06 55	02 09	03 11	04 12	05 11	
	21 133 34.6	54.6	193 55.4	11.0	20 51.1	10.3	56.3	35	06 07	06 39	07 06	02 19	03 23	04 27	05 27	
	22 148 34.5	54.2	208 25.4	11.0	21 01.4	10.2	56.3	40	06 16	06 49	07 19	02 29	03 37	04 44	05 46	
	23 163 34.4	53.9	222 55.4	10.9	21 11.6	10.1	56.3	45	06 25	07 02	07 35	02 42	03 54	05 04	06 09	
	00 178 34.3	N21 53.5	237 25.3	10.9	N21 21.7	10.0	56.3	S 50	06 35	07 16	07 54	02 58	04 15	05 30	06 38	
	01 193 34.3	53.2	251 55.2	10.8	21 31.7	9.9	56.2	52	06 40	07 23	08 02	03 05	04 25	05 42	06 52	
	02 208 34.2	52.8	266 25.0	10.8	21 41.6	9.8	56.2	54	06 45	07 30	08 12	03 13	04 37	05 57	07 08	
	03 223 34.1	52.5	280 54.8	10.7	21 51.4	9.7	56.2	56	06 50	07 38	08 24	03 22	04 50	06 14	07 28	
04 238 34.0	52.1	295 24.5	10.7	22 01.1	9.5	56.2	58	06 56	07 47	08 37	03 33	05 05	06 34	07 53		
FRIDAY	05 253 34.0	51.7	309 54.2	10.6	22 10.6	9.4	56.1	S 60	07 03	07 58	08 52	03 45	05 23	07 00	08 27	
	06 268 33.9	N21 51.4	324 23.8	10.6	N22 20.0	9.3	56.1	Lat.	Sunset	Twilight		Moonset				
	07 283 33.8	51.0	338 53.4	10.5	22 29.3	9.2	56.1			Civil	Naut.	12	13	14	15	
	08 298 33.7	50.7	353 22.9	10.5	22 38.5	9.1	56.1	°	h m	h m	h m	h m	h m	h m	h m	h m
	09 313 33.7	50.3	7 52.4	10.4	22 47.6	8.9	56.0									
	10 328 33.6	49.9	22 21.8	10.4	22 56.5	8.8	56.0	N 72								
	11 343 33.5	49.6	36 51.2	10.4	23 05.3	8.7	56.0	N 70								
	12 358 33.4	N21 49.2	51 20.6	10.3	N23 14.0	8.6	56.0	68				18 23				
	13 13 33.4	48.8	65 49.9	10.2	23 22.6	8.5	55.9	66	22 43	////	////	17 39				
	14 28 33.3	48.5	80 19.1	10.2	23 31.1	8.3	55.9	64	22 00	////	////	17 10	19 16			
	15 43 33.2	48.1	94 48.3	10.2	23 39.4	8.2	55.9	62	21 32	23 33	////	16 49	18 36	20 26	22 03	
SATURDAY	16 58 33.1	47.7	109 17.5	10.1	23 47.6	8.1	55.9	60	21 11	22 31	////	16 31	18 09	19 42	20 57	
	17 73 33.1	47.4	123 46.6	10.0	23 55.7	8.0	55.9	N 58	20 54	21 59	////	16 16	17 47	19 12	20 22	
	18 88 33.0	N21 47.0	138 15.6	10.1	N24 03.7	7.8	55.8	56	20 39	21 36	23 36	16 04	17 30	18 50	19 57	
	19 103 32.9	46.6	152 44.7	9.9	24 11.5	7.7	55.8	54	20 27	21 17	22 40	15 53	17 15	18 32	19 37	
	20 118 32.8	46.3	167 13.6	10.0	24 19.2	7.6	55.8	52	20 16	21 02	22 10	15 43	17 02	18 16	19 20	
	21 133 32.8	45.9	181 42.6	9.9	24 26.8	7.4	55.8	50	20 06	20 48	21 48	15 35	16 51	18 03	19 06	
	22 148 32.7	45.5	196 11.5	9.8	24 34.2	7.3	55.7	45	19 46	20 22	21 09	15 17	16 28	17 36	18 36	
	23 163 32.6	45.2	210 40.3	9.8	24 41.5	7.2	55.7	N 40	19 29	20 01	20 41	15 02	16 09	17 14	18 13	
	00 178 32.6	N21 44.8	225 09.1	9.8	N24 48.7	7.1	55.7	35	19 15	19 44	20 20	14 50	15 54	16 56	17 54	
	01 193 32.5	44.4	239 37.9	9.7	25 02.7	6.8	55.7	30	19 03	19 30	20 03	14 39	15 40	16 41	17 38	
	02 208 32.4	44.0	254 06.6	9.7	25 09.5	6.6	55.6	20	18 43	19 07	19 36	14 20	15 18	16 15	17 10	
03 223 32.3	43.7	268 35.3	9.7	25 16.1	6.6	55.6	N 10	18 26	18 48	19 15	14 04	14 58	15 52	16 47		
04 238 32.3	43.3	283 04.0	9.6	25 22.7	6.4	55.6	0	18 09	18 32	18 58	13 50	14 40	15 32	16 25		
SUNDAY	05 253 32.2	42.9	297 32.6	9.5	25 29.1	6.2	55.6	S 10	17 53	18 16	18 42	13 35	14 21	15 11	16 03	
	06 268 32.1	N21 42.5	312 01.1	9.6	N25 29.1	6.1	55.6	20	17 36	18 00	18 27	13 19	14 02	14 48	15 39	
	07 283 32.1	42.2	326 29.7	9.5	25 35.3	6.1	55.6	30	17 17	17 43	18 12	13 01	13 39	14 23	15 11	
	08 298 32.0	41.8	340 58.2	9.4	25 41.4	6.0	55.5	35	17 05	17 33	18 04	12 50	13 26	14 08	14 55	
	09 313 31.9	41.4	355 26.6	9.5	25 47.4	5.9	55.5	40	16 52	17 22	17 56	12 39	13 11	13 50	14 36	
	10 328 31.8	41.0	9 55.1	9.3	25 53.3	5.7	55.5	45	16 37	17 10	17 47	12 25	12 53	13 29	14 13	
	11 343 31.8	40.7	24 23.4	9.4	25 59.0	5.6	55.5	S 50	16 18	16 56	17 36	12 08	12 31	13 02	13 44	
	12 358 31.7	N21 40.3	38 51.8	9.3	N26 04.6	5.4	55.5	52	16 09	16 49	17 32	12 00	12 21	12 50	13 29	
	13 13 31.6	39.9	53 20.1	9.3	26 10.0	5.3	55.4	54	15 59	16 42	17 27	11 51	12 09	12 35	13 13	
	14 28 31.6	39.5	67 48.4	9.3	26 15.3	5.2	55.4	56	15 48	16 34	17 21	11 41	11 55	12 18	12 53	
	15 43 31.5	39.1	82 16.7	9.3	26 20.5	5.0	55.4	58	15 35	16 25	17 16	11 29	11 40	11 57	12 28	
16 58 31.4	38.8	96 45.0	9.2	26 25.5	4.9	55.4	S 60	15 20	16 14	17 09	11 17	11 21	11 31	11 54		
17 73 31.4	38.4	111 13.2	9.2	26 30.4	4.7	55.4	Day	SUN			MOON					
18 88 31.3	N21 38.0	125 41.4	9.1	N26 35.1	4.6	55.3		Eqn. of Time		Mer.	Mer. Pass.		Age	Phase		
19 103 31.2	37.6	140 09.5	9.2	26 39.7	4.5	55.3		00 ^h	12 ^h	Pass.	Upper	Lower				
20 118 31.2	37.2	154 37.7	9.1	26 44.2	4.3	55.3		d	m s	m s	h m	h m	h m	d %		
21 133 31.1	36.8	169 05.8	9.1	26 48.5	4.2	55.3	12	05 35	05 39	12 06	07 38	20 02	24 25			
22 148 31.0	36.5	183 33.9	9.0													

UT	ARIES		VENUS -4.7		MARS +1.8		JUPITER -2.3		SATURN +0.6		STARS			
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
1500	292 35.4	143 36.8	N10 40.5	137 29.3	N11 29.7	253 07.4	N14 10.7	313 35.9	S10 38.6	Acamar	315 12.9	S40 12.4		
01	307 37.9	158 38.7	39.8	152 30.3	29.2	268 09.5	10.8	328 38.5	38.7	Achernar	335 21.1	S57 06.8		
02	322 40.4	173 40.7	39.1	167 31.3	28.6	283 11.6	10.9	343 41.1	38.7	AcruX	173 01.6	S63 14.0		
03	337 42.8	188 42.6	.. 38.4	182 32.3	.. 28.0	298 13.7	.. 11.0	358 43.6	.. 38.7	Adhara	255 07.2	S29 00.1		
04	352 45.3	203 44.6	37.7	197 33.3	27.4	313 15.8	11.1	13 46.2	38.8	Aldebaran	290 41.3	N16 33.4		
05	7 47.8	218 46.6	37.0	212 34.4	26.9	328 17.9	11.2	28 48.7	38.8					
06	22 50.2	233 48.5	N10 36.3	227 35.4	N11 26.3	343 20.0	N14 11.3	43 51.3	S10 38.9	Alioth	166 14.1	N55 50.3		
07	37 52.7	248 50.5	35.6	242 36.4	25.7	358 22.1	11.4	58 53.9	38.9	Alkaid	152 52.9	N49 12.1		
08	52 55.2	263 52.5	34.9	257 37.4	25.1	13 24.2	11.5	73 56.4	39.0	Alnair	27 34.1	S46 50.7		
09	67 57.6	278 54.4	.. 34.2	272 38.4	.. 24.6	28 26.3	.. 11.6	88 59.0	.. 39.0	Alnilam	275 39.3	S 1 11.1		
10	83 00.1	293 56.4	33.6	287 39.5	24.0	43 28.4	11.7	104 01.6	39.1	Alphard	217 49.3	S 8 45.6		
11	98 02.5	308 58.4	32.9	302 40.5	23.4	58 30.5	11.8	119 04.1	39.1					
12	113 05.0	324 00.4	N10 32.2	317 41.5	N11 22.9	73 32.6	N14 11.9	134 06.7	S10 39.2	Alphecca	126 04.6	N26 38.3		
13	128 07.5	339 02.4	31.5	332 42.5	22.3	88 34.7	12.0	149 09.2	39.2	Alpheratz	357 35.9	N29 13.1		
14	143 09.9	354 04.4	30.8	347 43.5	21.7	103 36.8	12.1	164 11.8	39.3	Altair	62 00.8	N 8 55.8		
15	158 12.4	9 06.4	.. 30.1	2 44.6	.. 21.1	118 38.9	.. 12.2	179 14.4	.. 39.3	Ankaa	353 08.2	S42 10.5		
16	173 14.9	24 08.4	29.4	17 45.6	20.6	133 41.0	12.3	194 16.9	39.4	Antares	112 17.1	S26 29.1		
17	188 17.3	39 10.4	28.7	32 46.6	20.0	148 43.1	12.5	209 19.5	39.4					
18	203 19.8	54 12.4	N10 28.1	47 47.6	N11 19.4	163 45.2	N14 12.6	224 22.1	S10 39.5	Arcturus	145 49.0	N19 03.8		
19	218 22.3	69 14.4	27.4	62 48.6	18.8	178 47.3	12.7	239 24.6	39.5	Atria	107 11.9	S69 04.3		
20	233 24.7	84 16.4	26.7	77 49.7	18.3	193 49.5	12.8	254 27.2	39.6	Avior	234 15.9	S59 35.1		
21	248 27.2	99 18.5	.. 26.0	92 50.7	.. 17.7	208 51.6	.. 12.9	269 29.8	.. 39.6	Bellatrix	278 24.5	N 6 22.3		
22	263 29.7	114 20.5	25.3	107 51.7	17.1	223 53.7	13.0	284 32.3	39.7	Betelgeuse	270 53.7	N 7 24.7		
23	278 32.1	129 22.5	24.7	122 52.7	16.5	238 55.8	13.1	299 34.9	39.7					
1600	293 34.6	144 24.5	N10 24.0	137 53.7	N11 16.0	253 57.9	N14 13.2	314 37.4	S10 39.7	Canopus	263 53.5	S52 42.3		
01	308 37.0	159 26.6	23.3	152 54.8	15.4	269 00.0	13.3	329 40.0	39.8	Capella	280 24.1	N46 01.2		
02	323 39.5	174 28.6	22.6	167 55.8	14.8	284 02.1	13.4	344 42.6	39.8	Deneb	49 26.2	N45 21.8		
03	338 42.0	189 30.7	.. 21.9	182 56.8	.. 14.2	299 04.2	.. 13.5	359 45.1	.. 39.9	Denebola	182 26.3	N14 26.6		
04	353 44.4	204 32.7	21.3	197 57.8	13.7	314 06.3	13.6	14 47.7	39.9	Diphda	348 48.5	S17 51.3		
05	8 46.9	219 34.7	20.6	212 58.8	13.1	329 08.4	13.7	29 50.3	40.0					
06	23 49.4	234 36.8	N10 19.9	227 59.8	N11 12.5	344 10.5	N14 13.8	44 52.8	S10 40.0	Dubhe	193 42.9	N61 37.8		
07	38 51.8	249 38.9	19.2	243 00.9	11.9	359 12.6	13.9	59 55.4	40.1	Elnath	278 03.7	N28 37.6		
08	53 54.3	264 40.9	18.6	258 01.9	11.4	14 14.8	14.0	74 58.0	40.1	Eltanin	90 42.3	N51 29.2		
09	68 56.8	279 43.0	.. 17.9	273 02.9	.. 10.8	29 16.9	.. 14.1	90 00.5	.. 40.2	Enif	33 39.7	N 9 58.9		
10	83 59.2	294 45.0	17.2	288 03.9	10.2	44 19.0	14.2	105 03.1	40.2	Fomalhaut	15 15.6	S29 29.7		
11	99 01.7	309 47.1	16.6	303 04.9	09.6	59 21.1	14.3	120 05.7	40.3					
12	114 04.1	324 49.2	N10 15.9	318 06.0	N11 09.0	74 23.2	N14 14.4	135 08.2	S10 40.3	Gacrux	171 53.2	S57 14.9		
13	129 06.6	339 51.3	15.2	333 07.0	08.5	89 25.3	14.5	150 10.8	40.4	Gienah	175 45.0	S17 40.4		
14	144 09.1	354 53.3	14.6	348 08.0	07.9	104 27.4	14.6	165 13.4	40.4	Hadar	148 37.6	S60 29.4		
15	159 11.5	9 55.4	.. 13.9	3 09.0	.. 07.3	119 29.5	.. 14.7	180 15.9	.. 40.5	Hamal	327 52.6	N23 34.3		
16	174 14.0	24 57.5	13.2	18 10.0	06.7	134 31.6	14.8	195 18.5	40.5	Kaus Aust.	83 33.7	S34 22.4		
17	189 16.5	39 59.6	12.6	33 11.1	06.2	149 33.8	14.9	210 21.1	40.6					
18	204 18.9	55 01.7	N10 11.9	48 12.1	N11 05.6	164 35.9	N14 15.0	225 23.6	S10 40.6	Kochab	137 19.3	N74 03.8		
19	219 21.4	70 03.8	11.2	63 13.1	05.0	179 38.0	15.1	240 26.2	40.7	Markab	13 30.9	N15 19.8		
20	234 23.9	85 05.9	10.6	78 14.1	04.4	194 40.1	15.3	255 28.8	40.7	Menkar	314 07.6	N 4 10.9		
21	249 26.3	100 08.0	.. 09.9	93 15.1	.. 03.9	209 42.2	.. 15.4	270 31.3	.. 40.8	Menkent	147 59.0	S36 29.3		
22	264 28.8	115 10.1	09.2	108 16.2	03.3	224 44.3	15.5	285 33.9	40.8	Miaplacidus	221 39.4	S69 48.9		
23	279 31.3	130 12.2	08.6	123 17.2	02.7	239 46.4	15.6	300 36.5	40.9					
1700	294 33.7	145 14.3	N10 07.9	138 18.2	N11 02.1	254 48.5	N14 15.7	315 39.0	S10 40.9	Mirfak	308 30.3	N49 56.5		
01	309 36.2	160 16.4	07.0	153 19.2	01.5	269 50.7	15.8	330 41.6	41.0	Nunki	75 48.9	S26 16.0		
02	324 38.6	175 18.5	06.6	168 20.2	01.0	284 52.8	15.9	345 44.2	41.0	Peacock	53 07.1	S56 39.5		
03	339 41.1	190 20.7	.. 05.9	183 21.3	11 00.4	299 54.9	.. 16.0	0 46.7	.. 41.1	Pollux	243 19.2	N27 58.2		
04	354 43.6	205 22.8	05.3	198 22.3	10 59.8	314 57.0	16.1	15 49.3	41.1	Procyon	244 52.5	N 5 10.0		
05	9 46.0	220 24.9	04.6	213 23.3	59.2	329 59.1	16.2	30 51.9	41.2					
06	24 48.5	235 27.1	N10 04.0	228 24.3	N10 58.6	345 01.2	N14 16.3	45 54.4	S10 41.2	Rasalhague	95 59.4	N12 32.6		
07	39 51.0	250 29.2	03.3	243 25.3	58.1	0 03.3	16.4	60 57.0	41.3	Regulus	207 36.0	N11 51.3		
08	54 53.4	265 31.3	02.7	258 26.4	57.5	15 05.5	16.5	75 59.6	41.3	Rigel	281 05.3	S 8 10.4		
09	69 55.9	280 33.5	.. 02.0	273 27.4	.. 56.9	30 07.6	.. 16.6	91 02.1	.. 41.4	Rigel Kent.	139 41.8	S60 56.1		
10	84 58.4	295 35.6	01.3	288 28.4	56.3	45 09.7	16.7	106 04.7	41.4	Sabik	102 03.9	S15 45.2		
11	100 00.8	310 37.8	00.7	303 29.4	55.7	60 11.8	16.8	121 07.3	41.5					
12	115 03.3	325 39.9	N10 00.0	318 30.4	N10 55.2	75 13.9	N14 16.9	136 09.9	S10 41.5	Schedar	349 32.3	N56 39.7		
13	130 05.8	340 42.1	9 59.4	333 31.5	54.6	90 16.0	17.0	151 12.4	41.6	Shaula	96 11.7	S37 07.3		
14	145 08.2	355 44.3	58.3	348 32.5	54.0	105 18.2	17.1	166 15.0	41.6	Sirius	258 27.7	S16 44.8		
15	160 10.7	10 46.4	.. 58.1	3 33.5	.. 53.4	120 20.3	.. 17.2	181 17.6	.. 41.7	Spica	158 23.6	S11 17.0		
16	175 13.1	25 48.6	57.4	18 34.5	52.8	135 22.4	17.3	196 20.1	41.7	Suhail	222 47.6	S43 31.6		
17	190 15.6	40 50.8	56.8	33 35.5	52.3	150 24.5	17.4	211 22.7	41.8					
18	205 18.1	55 53.0	N 9 56.2	48 36.6	N10 51.7	165 26.6	N14 17.5	226 25.3	S10 41.8	Vega	80 33.6	N38 48.4		
19	220 20.5	70 55.1	55.5	63 37.6	51.1	180 28.7	17.6	241 27.8	41.9	Zuben'ubi	136 57.3	S16 08.4		
20	235 23.0	85 57.3	54.9	78 38.6	50.5	195 30.9	17.7	256 30.4	41.9					
21	250 25.5	100 59.5	.. 54.2	93 39.6	.. 49.9	210 33.0	.. 17.8	271 33.0	.. 42.0					
22	265 27.9	116 01.7	53.6	108 40.6	49.4	225 35.1	17.9	286 35.6	42.0					
23	280 30.4	131 03.9	52.9	123 41.7	48.8	240 37.2	18.0	301 38.1	42.1					
	h m													
Mer. Pass.	4 25.0	v 2.1	d 0.7	v 1.0	d 0.6	v 2.1	d 0.1	v 2.6	d 0.0	Saturn	21 02.9	3 01		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	15		16	17	18		
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m	
15	00	178 30.9	N21 35.7	212 30.0	9.0	N27 00.6	3.8 55.2	N 72	□	□	□	□	□	□	□	□	
	01	193 30.8	35.3	226 58.0	9.0	27 04.4	3.6 55.2	N 70	□	□	□	□	□	□	□	□	
	02	208 30.7	34.9	241 26.0	9.0	27 08.0	3.4 55.2	68	□	□	□	□	□	□	□	□	
	03	223 30.7	34.5	255 54.0	9.0	27 11.4	3.4 55.2	66	////	////	01 38	□	□	□	□	□	
	04	238 30.6	34.1	270 22.0	9.0	27 14.8	3.2 55.1	64	////	////	02 17	□	□	□	□	01 22	
SATURDAY	05	253 30.6	33.7	284 50.0	8.9	27 18.0	3.0 55.1	62	////	00 55	02 44	23 13	24 33	00 33	02 17		
	06	268 30.5	N21 33.4	299 17.9	9.0	N27 21.0	2.9 55.1	60	////	01 47	03 05	24 19	00 19	01 24	02 50		
	07	283 30.4	33.0	313 45.9	8.9	27 23.9	2.8 55.1	N 58	00 50	02 18	03 22	00 13	00 54	01 56	03 14		
	08	298 30.4	32.6	328 13.8	8.9	27 26.7	2.6 55.1	56	01 38	02 58	03 48	00 36	01 19	02 20	03 33		
	09	313 30.3	32.2	342 41.7	9.0	27 29.3	2.4 55.1	54	01 38	02 58	03 48	00 54	01 39	02 39	03 49		
	10	328 30.2	31.8	357 09.7	8.9	27 31.7	2.3 55.0	52	02 07	03 13	03 59	01 10	01 56	02 55	04 03		
	11	343 30.2	31.4	11 37.6	8.9	27 34.0	2.2 55.0	50	02 28	03 26	04 08	01 24	02 11	03 09	04 15		
	12	358 30.1	N21 31.0	26 05.5	8.9	N27 36.2	2.1 55.0	45	03 06	03 52	04 28	01 51	02 40	03 37	04 40		
	13	13 30.0	30.6	40 33.4	8.9	27 38.3	1.9 55.0	N 40	03 33	04 12	04 44	02 13	03 03	03 59	05 00		
	14	28 30.0	30.2	55 01.3	8.9	27 40.2	1.7 55.0	35	03 53	04 29	04 58	02 32	03 22	04 18	05 16		
	15	43 29.9	29.8	69 29.2	8.9	27 41.9	1.6 55.0	30	04 10	04 43	05 09	02 48	03 39	04 33	05 30		
	16	58 29.8	29.4	83 57.1	8.9	27 43.5	1.5 54.9	20	04 37	05 05	05 29	03 14	04 06	05 00	05 54		
	17	73 29.8	29.0	98 25.0	8.9	27 45.0	1.3 54.9	N 10	04 57	05 24	05 47	03 37	04 30	05 23	06 15		
	18	88 29.7	N21 28.6	112 52.9	9.0	N27 46.3	1.1 54.9	0	05 14	05 40	06 02	03 59	04 52	05 44	06 35		
	19	103 29.6	28.2	127 20.9	8.9	27 47.4	1.1 54.9	S 10	05 30	05 56	06 18	04 21	05 14	06 06	06 54		
	20	118 29.6	27.8	141 48.8	8.9	27 48.5	0.8 54.9	20	05 44	06 11	06 35	04 44	05 38	06 29	07 15		
	21	133 29.5	27.4	156 16.7	9.0	27 49.3	0.8 54.9	30	05 59	06 28	06 54	05 11	06 06	06 55	07 38		
	22	148 29.5	27.0	170 44.7	8.9	27 50.1	0.6 54.8	35	06 06	06 38	07 05	05 27	06 22	07 11	07 52		
	23	163 29.4	26.6	185 12.6	9.0	27 50.7	0.4 54.8	40	06 15	06 48	07 18	05 46	06 41	07 29	08 08		
	16	00	178 29.3	N21 26.2	199 40.6	9.0	N27 51.1	0.3 54.8	45	06 23	07 00	07 33	06 09	07 05	07 51	08 28	
		01	193 29.3	25.8	214 08.6	8.9	27 51.4	0.2 54.8	S 50	06 34	07 14	07 51	06 38	07 34	08 18	08 51	
		02	208 29.2	25.4	228 36.5	9.1	27 51.6	0.0 54.8	52	06 38	07 20	08 00	06 52	07 49	08 32	09 03	
		03	223 29.2	25.0	243 04.6	9.0	27 51.6	0.1 54.8	54	06 43	07 28	08 09	07 08	08 06	08 47	09 16	
		04	238 29.1	24.6	257 32.6	9.0	27 51.5	0.3 54.8	56	06 48	07 35	08 20	07 28	08 26	09 06	09 31	
		05	253 29.0	24.2	272 00.6	9.1	27 51.2	0.4 54.7	58	06 54	07 44	08 33	07 53	08 52	09 28	09 48	
06		268 29.0	N21 23.8	286 28.7	9.1	N27 50.8	0.6 54.7	S 60	07 00	07 54	08 47	08 27	09 28	09 57	10 10		
07		283 28.9	23.4	300 56.8	9.1	27 50.2	0.6 54.7		Lat.	Sunset	Twilight		Moonset				
08		298 28.8	23.0	315 24.9	9.1	27 49.6	0.9 54.7				Civil	Naut.	15	16	17	18	
09		313 28.8	22.6	329 53.0	9.2	27 48.7	1.0 54.7		°	h m	h m	h m	h m	h m	h m	h m	
10		328 28.7	22.2	344 21.2	9.2	27 47.7	1.1 54.7	N 72	□	□	□	□	□	□	□	□	
11		343 28.7	21.8	358 49.4	9.2	27 46.6	1.2 54.7	N 70	□	□	□	□	□	□	□	□	
12		358 28.6	N21 21.3	13 17.6	9.2	N27 45.4	1.4 54.6	68	□	□	□	□	□	□	□	□	
13		13 28.6	20.9	27 45.8	9.3	27 44.0	1.6 54.6	66	22 30	////	////	□	□	□	□	23 42	
14		28 28.5	20.5	42 14.1	9.3	27 42.4	1.7 54.6	64	21 52	////	////	□	□	□	□	23 01	
15		43 28.4	20.1	56 42.4	9.4	27 40.7	1.8 54.6	62	21 26	23 11	////	□	□	□	□	22 32	
16		58 28.4	19.7	71 10.8	9.4	27 38.9	1.9 54.6	60	21 06	22 22	////	22 03	22 33	22 35	22 32		
17		73 28.3	19.3	85 39.2	9.4	27 37.0	2.1 54.6	N 58	20 49	21 53	////	20 57	21 41	22 02	22 11		
18		88 28.3	N21 18.9	100 07.6	9.4	N27 34.9	2.2 54.6	56	20 35	21 31	23 16	20 22	21 10	21 37	21 53		
19		103 28.2	18.5	114 36.0	9.5	27 32.7	2.4 54.5	54	20 23	21 13	22 31	19 57	20 46	21 18	21 38		
20		118 28.1	18.0	129 04.5	9.5	27 30.3	2.5 54.5	52	20 13	20 58	22 04	19 37	20 27	21 01	21 25		
21		133 28.1	17.6	143 33.0	9.6	27 27.8	2.7 54.5	50	20 03	20 45	22 04	19 20	20 10	20 47	21 13		
22		148 28.0	17.2	158 01.6	9.6	27 25.1	2.7 54.5	45	20 13	20 45	21 43	19 06	19 56	20 35	21 03		
23		163 28.0	16.8	172 30.2	9.7	27 22.4	3.0 54.5		19 43	20 19	21 06	18 36	19 27	20 09	20 42		
17	00	178 27.9	N21 16.4	186 58.9	9.7	N27 19.4	3.0 54.5	N 40	19 27	19 59	20 39	18 13	19 05	19 48	20 24		
	01	193 27.9	16.0	201 27.6	9.7	27 16.4	3.2 54.5	35	19 14	19 43	20 18	17 54	18 46	19 31	20 10		
	02	208 27.8	15.5	215 56.3	9.8	27 13.2	3.3 54.5	30	19 02	19 29	20 02	17 38	18 30	19 17	19 57		
	03	223 27.7	15.1	230 25.1	9.9	27 09.9	3.4 54.4	20	18 43	19 07	19 35	17 10	18 03	18 51	19 35		
	04	238 27.7	14.7	244 54.0	9.9	27 06.5	3.6 54.4	N 10	18 26	18 48	19 15	16 47	17 39	18 29	19 16		
	05	253 27.6	14.3	259 22.9	9.9	27 02.9	3.7 54.4	0	18 10	18 32	18 58	16 25	17 18	18 09	18 58		
	06	268 27.6	N21 13.9	273 51.8	10.0	N26 59.2	3.9 54.4	S 10	17 54	18 16	18 42	16 03	16 56	17 48	18 40		
	07	283 27.5	13.4	288 20.8	10.1	26 55.3	4.0 54.4	20	17 37	18 01	18 28	15 39	16 32	17 26	18 20		
	08	298 27.5	13.0	302 49.9	10.1	26 51.3	4.1 54.4	30	17 18	17 44	18 14	15 11	16 04	17 01	17 58		
	09	313 27.4	12.6	317 19.0	10.1	26 47.2	4.2 54.4	35	17 07	17 35	18 06	14 55	15 48	16 45	17 45		
	10	328 27.4	12.2	331 48.1	10.2	26 43.0	4.3 54.4	40	16 55	17 24	17 58	14 36	15 29	16 28	17 29		
	11	343 27.3	11.8	346 17.3	10.3	26 38.7	4.5 54.4	45	16 40	17 13	17 49	14 13	15 06	16 06	17 11		
	12	358 27.3	N21 11.3	0 46.6	10.3	N26 34.2	4.6 54.3	S 50	16 21	16 59	17 39	13 44	14 37	15 39	16 48		
	13	13 27.2	10.9	15 15.9	10.4	26 29.6	4.8 54.3	52	16 13	16 52	17 35	13 29	14 22	15 26	16 37		
	14	28 27.1	10.5	29 45.3	10.4	26 24.8	4.8 54.3	54	16 03	16 45	17 30	13 13	14 05	15 11	16 25		
	15	43 27.1	10.0	44 14.7	10.5	26 20.0	5.0 54.3	56	15 52	16 37	17 25	12 53	13 45	14 53	16 10		
	16	58 27.0	09.6	58 44.2	10.6	26 15.0	5.1 54.3	58	15 40	16 29	17 19	12 28	13 19	14 31	15 53		
17	73 27.0	09.2	73 13.8	10.6	26 09.9	5.3 54.3	S 60	15 25	16 19	17 13	11 54	12 44	14 02	15 32			
MONDAY	18	88 26.9	N21 08.8	87 43.4	10.7	N26 04.6	5.3 54.3		SUN			MOON					
	19	103 26.9	08.3	102 13.1	10.7	25 59.3	5.5 54.3	Day	Eqn. of Time	Mer.	Mer. Pass.		Age	Phase			
	20	118 26.8	07.9	116 42.8	10.8	25 53.8	5.6 54.3		00 ^h	12 ^h	Pass.	Upper	Lower	d	%		
	21	133 26.8	07.5	131 12.6	10.9	25 48.2	5.7 54.3										
	22	148 26.7	07.0	145 42.5	10.9	25 42.5	5.9 54.2	d	m s	m s	h m	h m	h m	d	%		
	23	163 26.7	06.6	160 12.4	11.0	N25 36.6	5.9 54.2	15	05 56	05 59	12 06	10 12	22 38	27	5		
								16	06 03	06 05	12 06	11 05	23 31	28	2		
								17	06 08	06 11	12 06	11 57	24 22				

UT		ARIES		VENUS -4.7		MARS +1.8		JUPITER -2.3		SATURN +0.6		STARS				
		GHA		GHA Dec		GHA Dec		GHA Dec		GHA Dec		Name		SHA Dec		
d h		° ' "		° ' "		° ' "		° ' "		° ' "				° ' "		
TUESDAY	1800	295	32.9	146 06.1 N 9 52.3	138 42.7 N10 48.2	255 39.3 N14 18.1	316 40.7 S10 42.1	Acamar	315 12.8 S40 12.4							
	01	310	35.3	161 08.3 51.6	153 43.7 47.6	270 41.4 18.2	331 43.3 42.2	Achernar	335 21.1 S57 06.7							
	02	325	37.8	176 10.5 51.0	168 44.7 47.0	285 43.6 18.3	346 45.8 42.2	Acrux	173 01.7 S63 14.0							
	03	340	40.3	191 12.7 . . 50.4	183 45.8 . . 46.5	300 45.7 . . 18.4	1 48.4 . . 42.3	Adhara	255 07.2 S29 00.1							
	04	355	42.7	206 14.9 49.7	198 46.8 45.9	315 47.8 18.5	16 51.0 42.3	Aldebaran	290 41.3 N16 33.4							
	05	10	45.2	221 17.1 49.1	213 47.8 45.3	330 49.9 18.6	31 53.6 42.4									
	06	25	47.6	236 19.4 N 9 48.5	228 48.8 N10 44.7	345 52.0 N14 18.7	46 56.1 S10 42.4	Alioth	166 14.1 N55 50.3							
	07	40	50.1	251 21.6 47.8	243 49.8 44.1	0 54.2 18.8	61 58.7 42.5	Alkaid	152 52.9 N49 12.1							
	08	55	52.6	266 23.8 47.2	258 50.9 43.5	15 56.3 18.9	77 01.3 42.5	Alnair	27 34.0 S46 50.7							
	09	70	55.0	281 26.0 . . 46.6	273 51.9 . . 43.0	30 58.4 . . 19.0	92 03.8 . . 42.6	Alnilam	275 39.3 S 1 11.1							
	10	85	57.5	296 28.3 45.9	288 52.9 42.4	46 00.5 19.1	107 06.4 42.6	Alphard	217 49.3 S 8 45.6							
	11	101	00.0	311 30.5 45.3	303 53.9 41.8	61 02.6 19.2	122 09.0 42.7									
	12	116	02.4	326 32.8 N 9 44.7	318 54.9 N10 41.2	76 04.8 N14 19.3	137 11.6 S10 42.7	Alphecca	126 04.6 N26 38.3							
	13	131	04.9	341 35.0 44.0	333 56.0 40.6	91 06.9 19.4	152 14.1 42.8	Alpheratz	357 35.9 N29 13.1							
	14	146	07.4	356 37.2 43.4	348 57.0 40.0	106 09.0 19.5	167 16.7 42.8	Altair	62 00.8 N 8 55.8							
	15	161	09.8	11 39.5 . . 42.8	3 58.0 . . 39.5	121 11.1 . . 19.6	182 19.3 . . 42.9	Ankaa	353 08.2 S42 10.5							
	16	176	12.3	26 41.8 42.1	18 59.0 38.9	136 13.3 19.7	197 21.8 42.9	Antares	112 17.1 S26 29.1							
	17	191	14.8	41 44.0 41.5	34 00.0 38.3	151 15.4 19.8	212 24.4 43.0									
	18	206	17.2	56 46.3 N 9 40.9	49 01.1 N10 37.7	166 17.5 N14 19.9	227 27.0 S10 43.0	Arcturus	145 49.0 N19 03.8							
	19	221	19.7	71 48.5 40.3	64 02.1 37.1	181 19.6 20.0	242 29.6 43.1	Atria	107 12.0 S69 04.3							
	20	236	22.1	86 50.8 39.6	79 03.1 36.5	196 21.7 20.1	257 32.1 43.1	Avior	234 15.9 S59 35.0							
	21	251	24.6	101 53.1 . . 39.0	94 04.1 . . 36.0	211 23.9 . . 20.2	272 34.7 . . 43.2	Bellatrix	278 24.5 N 6 22.3							
	22	266	27.1	116 55.4 38.4	109 05.1 35.4	226 26.0 20.3	287 37.3 43.2	Betelgeuse	270 53.7 N 7 24.7							
	23	281	29.5	131 57.6 37.8	124 06.2 34.8	241 28.1 20.4	302 39.9 43.3									
WEDNESDAY	1900	296	32.0	146 59.9 N 9 37.2	139 07.2 N10 34.2	256 30.2 N14 20.5	317 42.4 S10 43.3	Canopus	263 53.5 S52 42.3							
	01	311	34.5	162 02.2 36.5	154 08.2 33.6	271 32.4 20.6	332 45.0 43.4	Capella	280 24.1 N46 01.2							
	02	326	36.9	177 04.5 35.9	169 09.2 33.0	286 34.5 20.7	347 47.6 43.4	Deneb	49 26.2 N45 21.8							
	03	341	39.4	192 06.8 . . 35.3	184 10.2 . . 32.5	301 36.6 . . 20.8	2 50.2 . . 43.5	Denebola	182 26.3 N14 26.6							
	04	356	41.9	207 09.1 34.7	199 11.3 31.9	316 38.7 20.9	17 52.7 43.6	Diphda	348 48.4 S17 51.3							
	05	11	44.3	222 11.4 34.1	214 12.3 31.3	331 40.9 21.0	32 55.3 43.6									
	06	26	46.8	237 13.7 N 9 33.4	229 13.3 N10 30.7	346 43.0 N14 21.1	47 57.9 S10 43.7	Dubhe	193 42.9 N61 37.7							
	07	41	49.2	252 16.0 32.8	244 14.3 30.1	1 45.1 21.2	63 00.5 43.7	Elnath	278 03.7 N28 37.6							
	08	56	51.7	267 18.3 32.2	259 15.4 29.5	16 47.2 21.3	78 03.0 43.8	Eltanin	90 42.3 N51 29.2							
	09	71	54.2	282 20.7 . . 31.6	274 16.4 . . 28.9	31 49.4 . . 21.4	93 05.6 . . 43.8	Enif	33 39.7 N 9 59.0							
	10	86	56.6	297 23.0 31.0	289 17.4 28.4	46 51.5 21.5	108 08.2 43.9	Fomalhaut	15 15.6 S29 29.7							
	11	101	59.1	312 25.3 30.4	304 18.4 27.8	61 53.6 21.6	123 10.8 43.9									
	12	117	01.6	327 27.6 N 9 29.8	319 19.4 N10 27.2	76 55.7 N14 21.7	138 13.3 S10 44.0	Gacrux	171 53.2 S57 14.9							
	13	132	04.0	342 30.0 29.2	334 20.5 26.6	91 57.9 21.7	153 15.9 44.0	Gienah	175 45.0 S17 40.4							
	14	147	06.5	357 32.3 28.6	349 21.5 26.0	107 00.0 21.8	168 18.5 44.1	Hadar	148 37.7 S60 29.4							
	15	162	09.0	12 34.7 . . 28.0	4 22.5 . . 25.4	122 02.1 . . 21.9	183 21.1 . . 44.1	Hamal	327 52.6 N23 34.3							
	16	177	11.4	27 37.0 27.3	19 23.5 24.8	137 04.3 22.0	198 23.6 44.2	Kaus Aust.	83 33.7 S34 22.4							
	17	192	13.9	42 39.3 26.7	34 24.5 24.3	152 06.4 22.1	213 26.2 44.2									
	18	207	16.4	57 41.7 N 9 26.1	49 25.6 N10 23.7	167 08.5 N14 22.2	228 28.8 S10 44.3	Kochab	137 19.4 N74 03.8							
	19	222	18.8	72 44.1 25.5	64 26.6 23.1	182 10.6 22.3	243 31.4 44.3	Markab	13 30.9 N15 19.9							
	20	237	21.3	87 46.4 24.9	79 27.6 22.5	197 12.8 22.4	258 33.9 44.4	Menkar	314 07.5 N 4 10.9							
	21	252	23.7	102 48.8 . . 24.3	94 28.6 . . 21.9	212 14.9 . . 22.5	273 36.5 . . 44.4	Menkent	147 59.0 S36 29.3							
	22	267	26.2	117 51.1 23.7	109 29.7 21.3	227 17.0 22.6	288 39.1 44.5	Miaplacidus	221 39.4 S69 48.8							
	23	282	28.7	132 53.5 23.1	124 30.7 20.7	242 19.2 22.7	303 41.7 44.5									
THURSDAY	2000	297	31.1	147 55.9 N 9 22.5	139 31.7 N10 20.1	257 21.3 N14 22.8	318 44.2 S10 44.6	Mirfak	308 30.2 N49 56.5							
	01	312	33.6	162 58.3 21.9	154 32.7 19.6	272 23.4 22.9	333 46.8 44.7	Nunki	75 48.9 S26 16.0							
	02	327	36.1	178 00.6 21.3	169 33.7 19.0	287 25.5 23.0	348 49.4 44.7	Peacock	53 07.0 S56 39.5							
	03	342	38.5	193 03.0 . . 20.7	184 34.8 . . 18.4	302 27.7 . . 23.1	3 52.0 . . 44.8	Pollux	243 19.2 N27 58.2							
	04	357	41.0	208 05.4 20.1	199 35.8 17.8	317 29.8 23.2	18 54.6 44.8	Procyon	244 52.4 N 5 10.0							
	05	12	43.5	223 07.8 19.6	214 36.8 17.2	332 31.9 23.3	33 57.1 44.9									
	06	27	45.9	238 10.2 N 9 19.0	229 37.8 N10 16.6	347 34.1 N14 23.4	48 59.7 S10 44.9	Rasalhague	95 59.4 N12 32.7							
	07	42	48.4	253 12.6 18.4	244 38.8 16.0	2 36.2 23.5	64 02.3 45.0	Regulus	207 36.0 N11 51.3							
	08	57	50.9	268 15.0 17.8	259 39.9 15.4	17 38.3 23.6	79 04.9 45.0	Rigel	281 05.3 S 8 10.4							
	09	72	53.3	283 17.4 . . 17.2	274 40.9 . . 14.9	32 40.5 . . 23.7	94 07.4 . . 45.1	Rigil Kent.	139 41.8 S60 56.1							
	10	87	55.8	298 19.8 16.6	289 41.9 14.3	47 42.6 23.8	109 10.0 45.1	Sabik	102 03.9 S15 45.2							
	11	102	58.2	313 22.2 16.0	304 42.9 13.7	62 44.7 23.9	124 12.6 45.2									
	12	118	00.7	328 24.7 N 9 15.4	319 44.0 N10 13.1	77 46.9 N14 24.0	139 15.2 S10 45.2	Schedar	349 32.3 N56 39.7							
	13	133	03.2	343 27.1 14.8	334 45.0 12.5	92 49.0 24.1	154 17.8 45.3	Shaula	96 11.7 S37 07.3							
	14	148	05.6	358 29.5 14.3	349 46.0 11.9	107 51.1 24.2	169 20.3 45.3	Sirius	258 27.6 S16 44.8							
	15	163	08.1	13 31.9 . . 13.7	4 47.0 . . 11.3	122 53.3 . . 24.2	184 22.9 . . 45.4	Spica	158 23.6 S11 17.0							
	16	178	10.6	28 34.4 13.1	19 48.0 10.7	137 55.4 24.3	199 25.5 45.4	Suhail	222 47.6 S43 31.6							
	17	193	13.0	43 36.8 12.5	34 49.1 10.1	152 57.5 24.4	214 28.1 45.5									
	18	208	15.5	58 39.3 N 9 11.9	49 50.1 N10 09.6	167 59.7 N14 24.5	229 30.7 S10 45.6	Vega	80 33.6 N38 48.4							
	19	223	18.0	73 41.7 11.3	64 51.1 09.0	183 01.8 24.6	244 33.2 45.6	Zuben'ubi	136 57.3 S16 08.4							
	20	238	20.4	88 44.2 10.8	79 52.1 08.4	198 03.9 24.7	259 35.8 45.7									
	21	253	22.9	103 46.6 . . 10.2	94 53.1 . . 07.8	213 06.1 . . 24.8	274 38.4 . . 45.7									
	22	268	25.3	118 49.1 09.6	109 54.2 07.2	228 08.2 24.9	289 41.0 45.8	Venus	210 27.9 14 10							
	23	283	27.8	133 51.5 09.0	124 55.2 06.6	243 1										

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	18		19	20	21						
d	h	m	s	°	'	°	'	°	'	°	'	°	'	°	'	°	'	°	'		
18	00	178	26.6	N21	06.2	174	42.4	11.1	N25	30.7	6.1	54.2	N 72	□	□	□	□	□	05 44		
	01	193	26.6		05.8	189	12.5	11.1	25	24.6	6.2	54.2	N 70	□	□	□	□	03 47	06 09		
	02	208	26.5		05.3	203	42.6	11.2	25	18.4	6.3	54.2	68	////	////	00 42	□	04 29	06 28		
	03	223	26.5		04.9	218	12.8	11.3	25	12.1	6.4	54.2	66	////	////	01 51	□	02 51	06 43		
	04	238	26.4		04.4	232	43.1	11.3	25	05.7	6.6	54.2	64	////	////	02 26	01 22	03 31	06 55		
	05	253	26.4		04.0	247	13.4	11.4	24	59.1	6.6	54.2	62	////		01 14	02 51	03 59	07 06		
	06	268	26.3	N21	03.6	261	43.8	11.4	N24	52.5	6.8	54.2	60	////		01 57	03 11	02 50	07 15		
	07	283	26.3		03.1	276	14.2	11.6	24	45.7	6.8	54.2	N 58	01 07	02 46	03 41	03 33	04 52	07 29		
	08	298	26.2		02.7	290	44.8	11.6	24	38.9	7.0	54.2	54	01 47	03 03	03 52	03 49	05 04	07 35		
	09	313	26.2		02.3	305	15.4	11.7	24	31.9	7.1	54.2	52	02 13	03 18	04 03	04 03	05 15	07 40		
TUESDAY	10	328	26.1		01.8	319	46.1	11.7	24	24.8	7.2	54.1	50	02 33	03 30	04 12	04 15	05 25	06 36		
	11	343	26.1		01.4	334	16.8	11.8	24	17.6	7.3	54.1	45	03 10	03 56	04 31	04 40	05 45	06 51		
	12	358	26.0	N21	00.9	348	47.6	11.9	N24	10.3	7.4	54.1	N 40	03 36	04 15	04 47	05 00	06 02	07 04		
	13	13	26.0		00.5	3	18.5	11.9	24	02.9	7.6	54.1	35	03 56	04 31	05 00	05 16	06 15	07 14		
	14	28	25.9	21	00.1	17	49.4	12.0	23	55.3	7.6	54.1	30	04 12	04 44	05 11	05 30	06 27	07 24		
	15	43	25.9	20	59.6	32	20.4	12.1	23	47.7	7.7	54.1	20	04 38	05 07	05 31	05 54	06 48	07 40		
	16	58	25.8		59.2	46	51.5	12.2	23	40.0	7.8	54.1	N 10	04 58	05 25	05 47	06 15	07 06	07 53		
	17	73	25.8		58.7	61	22.7	12.2	23	32.2	8.0	54.1	0	05 15	05 41	06 03	06 35	07 22	08 06		
	18	88	25.7	N20	58.3	75	53.9	12.3	N23	24.2	8.0	54.1	S 10	05 30	05 56	06 18	06 54	07 38	08 19		
	19	103	25.7		57.9	90	25.2	12.4	23	16.2	8.2	54.1	20	05 44	06 11	06 34	07 15	07 56	08 33		
WEDNESDAY	20	118	25.7		57.4	104	56.6	12.5	23	08.0	8.2	54.1	30	05 58	06 27	06 53	07 38	08 16	08 49		
	21	133	25.6		57.0	119	28.1	12.5	22	59.8	8.3	54.1	35	06 05	06 36	07 04	07 52	08 27	08 58		
	22	148	25.6		56.5	133	59.6	12.6	22	51.5	8.5	54.1	40	06 13	06 46	07 16	08 08	08 41	09 08		
	23	163	25.5		56.1	148	31.2	12.6	22	43.0	8.5	54.1	45	06 22	06 58	07 31	08 28	08 57	09 20		
	00	178	25.5	N20	55.6	163	02.8	12.8	N22	34.5	8.6	54.1	S 50	06 31	07 11	07 48	08 51	09 16	09 34		
	01	193	25.4		55.2	177	34.6	12.8	22	25.9	8.8	54.1	52	06 35	07 18	07 57	09 03	09 25	09 41		
	02	208	25.4		54.7	192	06.4	12.8	22	17.1	8.8	54.0	54	06 40	07 24	08 06	09 16	09 35	09 49		
	03	223	25.3		54.3	206	38.2	13.0	22	08.3	8.9	54.0	56	06 45	07 32	08 16	09 31	09 46	09 57		
	04	238	25.3		53.8	221	10.2	13.0	21	59.4	9.0	54.0	58	06 50	07 40	08 28	09 48	10 00	10 06		
	05	253	25.2		53.4	235	42.2	13.1	21	50.4	9.1	54.0	S 60	06 56	07 50	08 42	10 10	10 15	10 17		
THURSDAY	06	268	25.2	N20	52.9	250	14.3	13.1	N21	41.3	9.2	54.0		Lat.	Sunset	Twilight		Moonset			
	07	283	25.2		52.5	264	46.4	13.3	21	32.1	9.2	54.0				Civil	Naut.	18	19	20	21
	08	298	25.1		52.0	279	18.7	13.3	21	22.9	9.4	54.0									
	09	313	25.1		51.6	293	51.0	13.3	21	13.5	9.4	54.0									
	10	328	25.0		51.1	308	23.3	13.5	21	04.1	9.6	54.0									
	11	343	25.0		50.7	322	55.8	13.5	20	54.5	9.6	54.0	N 72	□	□	□	□	□	23 55	23 10	
	12	358	24.9	N20	50.2	337	28.3	13.5	N20	44.9	9.7	54.0	N 70	□	□	□	□	□	(09 38)	22 57	
	13	13	24.9		49.8	352	00.8	13.7	20	35.2	9.8	54.0	68	23 20	////	////	□	□	23 39	23 07	
	14	28	24.9		49.3	6	33.5	13.7	20	25.4	9.9	54.0	66	22 18	////	////	23 42	23 09	22 51	22 46	
	15	43	24.8		48.9	21	06.2	13.8	20	15.5	9.9	54.0	64	21 44	////	////	23 01	22 47	22 37	22 29	
FRIDAY	16	58	24.8		48.4	35	39.0	13.8	20	05.6	10.1	54.0	62	21 19	22 54	////	22 32	22 29	22 26	22 22	
	17	73	24.7		47.9	50	11.8	14.0	19	55.5	10.1	54.0	60	21 00	22 13	////	22 11	22 14	22 16	22 16	
	18	88	24.7	N20	47.5	64	44.8	13.9	N19	45.4	10.2	54.0	N 58	20 44	21 46	////	21 53	22 02	22 07	22 11	
	19	103	24.7		47.0	79	17.7	14.1	19	35.2	10.3	54.0	56	20 31	21 25	23 01	21 38	21 51	22 00	22 06	
	20	118	24.6		46.6	93	50.8	14.1	19	24.9	10.3	54.0	54	20 19	21 08	22 23	21 25	21 41	21 53	22 02	
	21	133	24.6		46.1	108	23.9	14.2	19	14.6	10.5	54.0	52	20 09	20 54	21 58	21 13	21 32	21 47	21 59	
	22	148	24.5		45.6	122	57.1	14.2	19	04.1	10.5	54.0	50	20 00	20 41	21 38	21 03	21 24	21 41	21 55	
	23	163	24.5		45.2	137	30.3	14.4	18	53.6	10.5	54.0	45	19 41	20 16	21 02	20 42	21 08	21 29	21 48	
	00	178	24.5	N20	44.7	152	03.7	14.3	N18	43.1	10.7	54.0	N 40	19 26	19 57	20 36	20 24	20 54	21 19	21 41	
	01	193	24.4		44.3	166	37.0	14.5	18	32.4	10.7	54.0	35	19 13	19 41	20 16	20 10	20 42	21 10	21 36	
02	208	24.4		43.8	181	10.5	14.5	18	21.7	10.8	54.0	30	19 01	19 28	20 00	19 57	20 32	21 03	21 31		
03	223	24.3		43.3	195	44.0	14.6	18	10.9	10.9	54.0	20	18 42	19 06	19 34	19 35	20 14	20 50	21 22		
04	238	24.3		42.9	210	17.6	14.6	18	00.0	10.9	54.0	N 10	18 25	18 48	19 14	19 16	19 58	20 38	21 15		
05	253	24.3		42.4	224	51.2	14.7	17	49.1	11.1	54.0	0	18 10	18 32	18 58	18 58	19 44	20 27	21 08		
SATURDAY	06	268	24.2	N20	41.9	239	24.9	14.7	N17	38.0	11.0	54.0	S 10	17 55	18 17	18 43	18 40	19 29	20 16	21 01	
	07	283	24.2		41.5	253	58.6	14.8	17	27.0	11.2	54.0	20	17 38	18 02	18 29	18 20	19 13	20 04	20 53	
	08	298	24.1		41.0	268	32.4	14.9	17	15.8	11.2	54.0	30	17 20	17 46	18 15	17 58	18 55	19 50	20 44	
	09	313	24.1		40.5	283	06.3	14.9	17	04.6	11.3	54.0	35	17 09	17 37	18 08	17 45	18 44	19 42	20 39	
	10	328	24.1		40.1	297	40.2	15.0	16	53.3	11.3	54.0	40	16 57	17 27	18 00	17 29	18 32	19 33	20 33	
	11	343	24.0		39.6	312	14.2	15.1	16	42.0	11.5	54.0	45	16 42	17 15	17 51	17 11	18 17	19 22	20 27	
	12	358	24.0	N20	39.1	326	48.3	15.1	N16	30.5	11.4	54.0	S 50	16 25	17 02	17 42	16 48	17 59	19 09	20 18	
	13	13	24.0		38.7	341	22.4	15.2	16	19.1	11.6	54.0	52	16 17	16 55	17 38	16 37	17 50	19 03	20 15	
	14	28	23.9		38.2	355	56.6	15.2	16	07.5	11.6	54.0	54	16 07	16 49	17 33	16 25	17 41	18 56	20 10	
	15	43	23.9		37.7	10	30.8	15.2	15	55.9	11.7	54.0	56	15 57	16 41	17 28	16 10	17 30	18 49	20 06	
SUNDAY	16	58	23.8		37.3	25	05.0	15.4	15	44.2	11.7	54.0	58	15 45	16 33	17 23	15 53	17 17	18 40	20 01	
	17	73	23.8		36.8	39	39.4	15.													

UT		ARIES		VENUS −4.6		MARS +1.8		JUPITER −2.3		SATURN +0.6		STARS		
		GHA		GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
d h		° /		° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /
FRI DAY	21 00	298 30.3		148 54.0 N	9 08.5	139 56.2 N	10 06.0	258 12.5 N	14 25.1	319 46.1 S	10 45.9	Acamar	315 12.8 S	40 12.4
	01	313 32.7		163 56.5	07.9	154 57.2	05.4	273 14.6	25.2	334 48.7	45.9	Achernar	335 21.0 S	57 06.7
	02	328 35.2		178 58.9	07.3	169 58.3	04.8	288 16.7	25.3	349 51.3	46.0	Acrux	173 01.7 S	63 14.0
	03	343 37.7		194 01.4	06.7	184 59.3	04.2	303 18.9	25.4	4 53.9	46.0	Adhara	255 07.2 S	29 00.1
	04	358 40.1		209 03.9	06.2	200 00.3	03.7	318 21.0	25.5	19 56.5	46.1	Aldebaran	290 41.2 N	16 33.4
	05	13 42.6		224 06.4	05.6	215 01.3	03.1	333 23.1	25.6	34 59.0	46.1			
	06	28 45.1		239 08.9 N	9 05.0	230 02.3 N	10 02.5	348 25.3 N	14 25.7	50 01.6 S	10 46.2	Alioth	166 14.2 N	55 50.3
	07	43 47.5		254 11.3	04.5	245 03.4	01.9	3 27.4	25.8	65 04.2	46.3	Alkaid	152 53.0 N	49 12.1
	08	58 50.0		269 13.8	03.9	260 04.4	01.3	18 29.5	25.9	80 06.8	46.3	Alnair	27 34.0 S	46 50.7
	09	73 52.5		284 16.3	03.3	275 05.4	00.7	33 31.7	25.9	95 09.4	46.4	Alnilam	275 39.2 S	1 11.1
	10	88 54.9		299 18.8	02.8	290 06.4	10 00.1	48 33.8	26.0	110 11.9	46.4	Alphard	217 49.3 S	8 45.5
	11	103 57.4		314 21.3	02.2	305 07.5	9 59.5	63 36.0	26.1	125 14.5	46.5			
	12	118 59.8		329 23.9 N	9 01.6	320 08.5 N	9 58.9	78 38.1 N	14 26.2	140 17.1 S	10 46.5	Alphecca	126 04.6 N	26 38.3
	13	134 02.3		344 26.4	01.1	335 09.5	58.3	93 40.2	26.3	155 19.7	46.6	Alpheratz	357 35.9 N	29 13.1
	14	149 04.8		359 28.9	00.5	350 10.5	57.7	108 42.4	26.4	170 22.3	46.6	Altair	62 00.8 N	8 55.9
	15	164 07.2		14 31.4	0 00.0	5 11.5	57.2	123 44.5	26.5	185 24.9	46.7	Ankaa	353 08.2 S	42 10.5
	16	179 09.7		29 33.9	8 59.4	20 12.6	56.6	138 46.7	26.6	200 27.4	46.7	Antares	112 17.1 S	26 29.1
	17	194 12.2		44 36.5	58.9	35 13.6	56.0	153 48.8	26.7	215 30.0	46.8			
	18	209 14.6		59 39.0 N	8 58.3	50 14.6 N	9 55.4	168 50.9 N	14 26.8	230 32.6 S	10 46.9	Arcturus	145 49.0 N	19 03.8
	19	224 17.1		74 41.5	57.7	65 15.6	54.8	183 53.1	26.9	245 35.2	46.9	Atria	107 12.0 S	69 04.3
	20	239 19.6		89 44.1	57.2	80 16.7	54.2	198 55.2	27.0	260 37.8	47.0	Avior	234 15.9 S	59 35.0
	21	254 22.0		104 46.6	56.6	95 17.7	53.6	213 57.4	27.1	275 40.4	47.0	Bellatrix	278 24.4 N	6 22.3
	22	269 24.5		119 49.2	56.1	110 18.7	53.0	228 59.5	27.2	290 42.9	47.1	Betelgeuse	270 53.7 N	7 24.7
	23	284 27.0		134 51.7	55.5	125 19.7	52.4	244 01.6	27.2	305 45.5	47.1			
SAT DAY	22 00	299 29.4		149 54.3 N	8 55.0	140 20.7 N	9 51.8	259 03.8 N	14 27.3	320 48.1 S	10 47.2	Canopus	263 53.4 S	52 42.3
	01	314 31.9		164 56.8	54.4	155 21.8	51.2	274 05.9	27.4	335 50.7	47.2	Capella	280 24.1 N	46 01.2
	02	329 34.3		179 59.4	53.9	170 22.8	50.6	289 08.1	27.5	350 53.3	47.3	Deneb	49 26.2 N	45 21.8
	03	344 36.8		195 02.0	53.3	185 23.8	50.0	304 10.2	27.6	5 55.8	47.4	Denebola	182 26.4 N	14 26.6
	04	359 39.3		210 04.5	52.8	200 24.8	49.4	319 12.3	27.7	20 58.4	47.4	Diphda	348 48.4 S	17 51.3
	05	14 41.7		225 07.1	52.2	215 25.9	48.9	334 14.5	27.8	36 01.0	47.5			
	06	29 44.2		240 09.7 N	8 51.7	230 26.9 N	9 48.3	349 16.6 N	14 27.9	51 03.6 S	10 47.5	Dubhe	193 42.9 N	61 37.7
	07	44 46.7		255 12.3	51.2	245 27.9	47.7	4 18.8	28.0	66 06.2	47.6	Elnath	278 03.7 N	28 37.6
	08	59 49.1		270 14.9	50.6	260 28.9	47.1	19 20.9	28.1	81 08.8	47.6	Eltanin	90 42.3 N	51 29.3
	09	74 51.6		285 17.5	50.1	275 29.9	46.5	34 23.0	28.2	96 11.4	47.7	Enif	33 39.7 N	9 59.0
	10	89 54.1		300 20.1	49.5	290 31.0	45.9	49 25.2	28.3	111 13.9	47.7	Fomalhaut	15 15.6 S	29 29.7
	11	104 56.5		315 22.7	49.0	305 32.0	45.3	64 27.3	28.3	126 16.5	47.8			
	12	119 59.0		330 25.3 N	8 48.5	320 33.0 N	9 44.7	79 29.5 N	14 28.4	141 19.1 S	10 47.8	Gacrux	171 53.2 S	57 14.9
	13	135 01.4		345 27.9	47.9	335 34.0	44.1	94 31.6	28.5	156 21.7	47.9	Gienah	175 45.0 S	17 40.3
	14	150 03.9		0 30.5	47.4	350 35.1	43.5	109 33.8	28.6	171 24.3	48.0	Hadar	148 37.7 S	60 29.4
	15	165 06.4		15 33.1	46.9	5 36.1	42.9	124 35.9	28.7	186 26.9	48.0	Hamal	327 52.4 N	23 34.3
	16	180 08.8		30 35.7	46.3	20 37.1	42.3	139 38.1	28.8	201 29.4	48.1	Kaus Aust.	83 33.7 S	34 22.4
	17	195 11.3		45 38.3	45.8	35 38.1	41.7	154 40.2	28.9	216 32.0	48.1			
	18	210 13.8		60 41.0 N	8 45.3	50 39.1 N	9 41.1	169 42.3 N	14 29.0	231 34.6 S	10 48.2	Kochab	137 19.4 N	74 03.8
	19	225 16.2		75 43.6	44.7	65 40.2	40.5	184 44.5	29.1	246 37.2	48.2	Markab	13 30.9 N	15 19.9
	20	240 18.7		90 46.2	44.2	80 41.2	39.9	199 46.6	29.2	261 39.8	48.3	Menkar	314 07.5 N	4 10.9
	21	255 21.2		105 48.9	43.7	95 42.2	39.3	214 48.8	29.3	276 42.4	48.3	Menkent	147 59.0 S	36 29.3
	22	270 23.6		120 51.5	43.2	110 43.2	38.7	229 50.9	29.3	291 45.0	48.4	Miaplacidus	221 39.4 S	69 48.8
	23	285 26.1		135 54.1	42.6	125 44.3	38.1	244 53.1	29.4	306 47.5	48.5			
SUN DAY	23 00	300 28.6		150 56.8 N	8 42.1	140 45.3 N	9 37.6	259 55.2 N	14 29.5	321 50.1 S	10 48.5	Mirfak	308 30.2 N	49 56.5
	01	315 31.0		165 59.4	41.6	155 46.3	37.0	274 57.4	29.6	336 52.7	48.6	Nunki	75 48.9 S	26 16.0
	02	330 33.5		181 02.1	41.1	170 47.3	36.4	289 59.5	29.7	351 55.3	48.6	Peacock	53 07.0 S	56 39.5
	03	345 35.9		196 04.8	40.6	185 48.4	35.8	305 01.7	29.8	6 57.9	48.7	Pollux	243 19.2 N	27 58.2
	04	0 38.4		211 07.4	40.0	200 49.4	35.2	320 03.8	29.9	22 00.5	48.7	Procyon	244 52.4 N	5 10.0
	05	15 40.9		226 10.1	39.5	215 50.4	34.6	335 06.0	30.0	37 03.1	48.8			
	06	30 43.3		241 12.8 N	8 39.0	230 51.4 N	9 34.0	350 08.1 N	14 30.1	52 05.6 S	10 48.9	Rasalhague	95 59.4 N	12 32.7
	07	45 45.8		256 15.4	38.5	245 52.4	33.4	5 10.3	30.2	67 08.2	48.9	Regulus	207 36.0 N	11 51.3
	08	60 48.3		271 18.1	38.0	260 53.5	32.8	20 12.4	30.2	82 10.8	49.0	Rigel	281 05.3 S	8 10.4
	09	75 50.7		286 20.8	37.5	275 54.5	32.2	35 14.5	30.3	97 13.4	49.0	Rigel Kent.	139 41.9 S	60 56.1
	10	90 53.2		301 23.5	36.9	290 55.5	31.6	50 16.7	30.4	112 16.0	49.1	Sabik	102 03.9 S	15 45.2
	11	105 55.7		316 26.2	36.4	305 56.5	31.0	65 18.8	30.5	127 18.6	49.1			
	12	120 58.1		331 28.9 N	8 35.9	320 57.6 N	9 30.4	80 21.0 N	14 30.6	142 21.2 S	10 49.2	Schedar	349 32.3 N	56 39.7
	13	136 00.6		346 31.6	35.4	335 58.6	29.8	95 23.1	30.7	157 23.8	49.2	Shaula	96 11.7 S	37 07.3
	14	151 03.1		1 34.3	34.9	350 59.6	29.2	110 25.3	30.8	172 26.3	49.3	Sirius	258 27.6 S	16 44.8
	15	166 05.5		16 37.0	34.4	6 00.6	28.6	125 27.4	30.9	187 28.9	49.4	Spica	158 23.6 S	11 17.0
	16	181 08.0		31 39.7	33.9	21 01.7	28.0	140 29.6	31.0	202 31.5	49.4	Suhail	222 47.6 S	43 31.6
	17	196 10.4		46 42.4	33.4	36 02.7	27.4	155 31.7	31.0	217 34.1	49.5			
	18	211 12.9		61 45.1 N	8 32.9	51 03.7 N	9 26.8	170 33.9 N	14 31.1	232 36.7 S	10 49.5	Vega	80 33.6 N	38 48.4
	19	226 15.4		76 47.9	32.4	66 04.7	26.2	185 36.0	31.2	247 39.3	49.6	Zuben'ubi	136 57.3 S	16 08.4
	20	241 17.8		91 50.6	31.9	81 05.7	25.6	200 38.2	31.3	262 41.9	49.6			
	21	256 20.3		106 53.3	31.4	96 06.8	25.0	215 40.3	31.4	277 44.5	49.7			
	22	271 22.8		121 56.1	30.9	111 07.8	24.4	230 42.5	31.5	292 47.1	49.8	Venus	210 24.9 S	13 58
	23	286 25.2		136 58.8	30.4	126 08.8	23.8	245 44.7	31.6	307 49.6	49.8	Mars	200 51.3 S	14 38
h m												Jupiter	319 34.4 S	6 43
Mer. Pass. 4 01.4				v 2.6 d 0.5		v 1.0 d 0.6		v 2.1 d 0.1		v 2.6 d 0.1		Saturn	21 18.7 S	2 36

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	21	22	23
										h				
21 F R I D A Y	00	178 23.6 N20 33.5	141 41.1 15.8	N14	08.8 12.2	54.0	N 72				05 44	07 54	09 52	11 51
	01	193 23.5 33.0	156 15.9 15.8	13	56.6 12.2	54.0	N 70				06 09	08 05	09 54	11 44
	02	208 23.5 32.5	170 50.7 15.8	13	44.4 12.3	54.0	68	////	////	01 12	06 28	08 14	09 56	11 38
	03	223 23.5 32.0	185 25.5 15.9	13	32.1 12.3	54.0	66	////	////	02 04	06 43	08 22	09 57	11 33
	04	238 23.4 31.6	200 00.4 15.9	13	19.8 12.4	54.0	64	////	////	02 36	06 55	08 28	09 58	11 29
	05	253 23.4 31.1	214 35.3 15.9	13	07.4 12.4	54.0	62	////	01 29	02 59	07 06	08 33	09 59	11 25
	06	268 23.4 N20 30.6	229 10.2 16.1	N12	55.0 12.5	54.0	60	////	02 07	03 17	07 15	08 38	09 59	11 22
	07	283 23.3 30.1	243 45.3 16.0	12	42.5 12.6	54.0	N 58	////	02 33	03 33	07 22	08 42	10 00	11 20
	08	298 23.3 29.6	258 20.3 16.1	12	29.9 12.5	54.0	56	01 22	02 52	03 45	07 29	08 45	10 01	11 17
	09	313 23.3 29.2	272 55.4 16.1	12	17.4 12.7	54.0	54	01 56	03 09	03 57	07 35	08 48	10 01	11 15
	10	328 23.2 28.7	287 30.5 16.2	12	04.7 12.6	54.0	52	02 20	03 23	04 07	07 40	08 51	10 02	11 13
	11	343 23.2 28.2	302 05.7 16.2	11	52.1 12.8	54.0	50	02 39	03 35	04 15	07 45	08 54	10 02	11 11
	12	358 23.2 N20 27.7	316 40.9 16.3	N11	39.3 12.7	54.1	45	03 14	03 59	04 34	07 56	09 00	10 03	11 07
	13	13 23.2 27.2	331 16.2 16.3	11	26.6 12.8	54.1	N 40	03 39	04 18	04 49	08 04	09 04	10 04	11 04
	14	28 23.1 26.7	345 51.5 16.3	11	13.8 12.9	54.1	35	03 58	04 33	05 02	08 12	09 08	10 05	11 02
	15	43 23.1 26.3	0 26.8 16.4	11	00.9 12.9	54.1	30	04 14	04 46	05 13	08 18	09 12	10 05	10 59
	16	58 23.1 25.8	15 02.2 16.3	10	48.0 12.9	54.1	20	04 39	05 08	05 32	08 29	09 18	10 06	10 55
	17	73 23.0 25.3	29 37.5 16.5	10	35.1 13.0	54.1	N 10	04 59	05 25	05 48	08 39	09 24	10 07	10 52
	18	88 23.0 N20 24.8	44 13.0 16.4	N10	22.1 13.0	54.1	0	05 15	05 41	06 03	08 48	09 29	10 08	10 48
	19	103 23.0 24.3	58 48.4 16.5	10	09.1 13.1	54.1	S 10	05 30	05 56	06 18	08 57	09 34	10 09	10 45
	20	118 23.0 23.8	73 23.9 16.5	9	56.0 13.1	54.1	20	05 43	06 10	06 34	09 07	09 39	10 10	10 41
	21	133 22.9 23.3	87 59.4 16.6	9	42.9 13.1	54.1	30	05 57	06 26	06 52	09 18	09 45	10 11	10 38
	22	148 22.9 22.8	102 35.0 16.6	9	29.8 13.2	54.1	35	06 04	06 35	07 02	09 24	09 49	10 12	10 35
	23	163 22.9 22.3	117 10.6 16.6	9	16.6 13.2	54.1	40	06 11	06 44	07 14	09 31	09 53	10 13	10 33
22	00	178 22.8 N20 21.9	131 46.2 16.6	N 9	03.4 13.2	54.1	45	06 19	06 56	07 28	09 40	09 57	10 13	10 30
01	193 22.8 21.4	146 21.8 16.7	8	50.2 13.3	54.2	S 50	06 29	07 09	07 45	09 50	10 02	10 14	10 26	
02	208 22.8 20.9	160 57.5 16.7	8	36.9 13.3	54.2	52	06 33	07 15	07 53	09 54	10 05	10 15	10 25	
03	223 22.8 20.4	175 33.2 16.7	8	23.6 13.4	54.2	54	06 37	07 21	08 02	09 59	10 08	10 15	10 23	
04	238 22.7 19.9	190 08.9 16.7	8	10.2 13.4	54.2	56	06 42	07 28	08 12	10 05	10 11	10 16	10 21	
05	253 22.7 19.4	204 44.6 16.8	7	56.8 13.4	54.2	58	06 47	07 36	08 23	10 11	10 14	10 17	10 19	
06	268 22.7 N20 18.9	219 20.4 16.7	N 7	43.4 13.4	54.2	S 60	06 52	07 45	08 37	10 18	10 18	10 17	10 17	
07	283 22.7 18.4	233 56.1 16.8	7	30.0 13.5	54.2		Lat.	Sunset	Twilight		Moonset			
08	298 22.6 17.9	248 31.9 16.9	7	16.5 13.5	54.2				Civil	Naut.	21	22	23	24
09	313 22.6 17.4	263 07.8 16.8	7	03.0 13.6	54.2									
10	328 22.6 16.9	277 43.6 16.8	6	49.4 13.5	54.2									
11	343 22.6 16.4	292 19.4 16.9	6	35.9 13.6	54.3	N 72				23 10	22 37	22 07	21 34	
12	358 22.5 N20 15.9	306 55.3 16.9	N 6	22.3 13.6	54.3	N 70				22 57	22 32	22 09	21 44	
13	13 22.5 15.4	321 31.2 16.9	6	08.7 13.7	54.3	68	22 54	////	////	22 46	22 28	22 11	21 53	
14	28 22.5 14.9	336 07.1 16.9	5	55.0 13.7	54.3	66	22 05	////	////	22 37	22 24	22 12	22 00	
15	43 22.5 14.4	350 43.0 16.9	5	41.3 13.7	54.3	64	21 35	////	////	22 29	22 21	22 13	22 05	
16	58 22.4 13.9	5 18.9 16.9	5	27.6 13.7	54.3	62	21 12	22 39	////	22 22	22 18	22 15	22 11	
17	73 22.4 13.4	19 54.8 16.9	5	13.9 13.8	54.3	60	20 54	22 03	////	22 16	22 16	22 16	22 15	
18	88 22.4 N20 12.9	34 30.7 17.0	N 5	00.1 13.7	54.3	N 58	20 39	21 38	////	22 11	22 14	22 16	22 19	
19	103 22.4 12.4	49 06.7 16.9	4	46.4 13.8	54.4	56	20 26	21 19	22 47	22 06	22 12	22 17	22 23	
20	118 22.3 11.9	63 42.6 17.0	4	32.6 13.8	54.4	54	20 15	21 03	22 14	22 02	22 10	22 18	22 26	
21	133 22.3 11.4	78 18.6 16.9	4	18.8 13.9	54.4	52	20 05	20 49	21 51	21 59	22 09	22 19	22 29	
22	148 22.3 10.9	92 54.5 17.0	4	04.9 13.8	54.4	50	19 57	20 37	21 33	21 55	22 07	22 19	22 31	
23	163 22.3 10.4	107 30.5 17.0	3	51.1 13.9	54.4	45	19 38	20 13	20 58	21 48	22 04	22 20	22 37	
23	00	178 22.3 N20 09.9	122 06.5 16.9	N 3	37.2 13.9	54.4	N 40	19 23	19 55	20 33	21 41	22 02	22 22	22 42
01	193 22.2 09.4	136 42.4 17.0	3	23.3 13.9	54.4	35	19 11	19 39	20 14	21 36	21 59	22 23	22 46	
02	208 22.2 08.9	151 18.4 17.0	3	09.4 14.0	54.4	30	19 00	19 26	19 58	21 31	21 57	22 23	22 50	
03	223 22.2 08.4	165 54.4 16.9	2	55.4 13.9	54.5	20	18 41	19 05	19 33	21 22	21 54	22 25	22 57	
04	238 22.2 07.9	180 30.3 17.0	2	41.5 14.0	54.5	N 10	18 25	18 48	19 14	21 15	21 51	22 26	23 02	
05	253 22.1 07.4	195 06.3 17.0	2	27.5 14.0	54.5	0	18 10	18 32	18 58	21 08	21 48	22 27	23 08	
06	268 22.1 N20 06.9	209 42.3 16.9	N 2	13.5 14.0	54.5	S 10	17 55	18 18	18 43	21 01	21 45	22 28	23 13	
07	283 22.1 06.4	224 18.2 17.0	1	59.5 14.0	54.5	20	17 40	18 03	18 30	20 53	21 41	22 30	23 19	
08	298 22.1 05.9	238 54.2 16.9	1	45.5 14.1	54.5	30	17 22	17 47	18 16	20 44	21 38	22 31	23 26	
09	313 22.1 05.3	253 30.1 16.9	1	31.4 14.0	54.6	35	17 11	17 38	18 09	20 39	21 36	22 32	23 30	
10	328 22.1 04.8	268 06.0 17.0	1	17.4 14.1	54.6	40	16 59	17 29	18 02	20 33	21 33	22 33	23 34	
11	343 22.0 04.3	282 42.0 16.9	1	03.3 14.0	54.6	45	16 45	17 18	17 54	20 27	21 30	22 34	23 39	
12	358 22.0 N20 03.8	297 17.9 16.9	N 0	49.3 14.1	54.6	S 50	16 28	17 05	17 45	20 18	21 27	22 35	23 45	
13	13 22.0 03.3	311 53.8 16.9	0	35.2 14.1	54.6	52	16 20	16 59	17 41	20 15	21 25	22 36	23 48	
14	28 22.0 02.8	326 29.7 16.8	0	21.1 14.1	54.6	54	16 12	16 52	17 37	20 10	21 23	22 36	23 51	
15	43 22.0 02.3	341 05.5 16.9	N 0	07.0 14.1	54.7	56	16 02	16 45	17 32	20 06	21 21	22 37	23 55	
16	58 21.9 01.8	355 41.4 16.8	S 0	07.1 14.1	54.7	58	15 50	16 37	17 27	20 01	21 19	22 38	23 59	
17	73 21.9 01.3	10 17.2 16.8	0	21.2 14.2	54.7	S 60	15 37	16 28	17 22	19 55	21 17	22 39	24 03	
18	88 21.9 N20 00.7	24 53.0 16.8	S 0	35.4 14.1	54.7		SUN			MOON				
19	103 21.9 20 00.2	39 28.8 16.8	0	49.5 14.1	54.7		Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase
20	118 21.9 19 59.7	54 04.6 16.8	1	03.6 14.2	54.8			00 ^h	12 ^h	Pass.	Upper	Lower		
21	133 21.9 19 59.2	68 40.4 16.7	1	17.8 14.1	54.8		d	m s	m s	h m	h m	h m	d	%
22	148 21.8 58.7	83 16.1 16.7	1	31.9 14.2	54.8		21	06 26	06 27	12 06	14 58	02 38	04 12	
23	163 21.8 58.2	97 51.8 16.7	S 1	46.1 14.1	54.8		22	06 29	06 30	12 06	15 38	03 18	05 19	
	SD 15.8 d 0.5	SD 14.7 14.8 14.9					23	06 31	06 32	12 07	16 18	03 58	06 27	

UT	ARIES		VENUS −4.6		MARS +1.8		JUPITER −2.3		SATURN +0.5		STARS																		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec																
MONDAY	24 00	301 27.7	152 01.5 N 8 29.9	141 09.8 N 9 23.2	260 46.8 N14 31.7	322 52.2 S10 49.9	Acamar	315 12.8 S40 12.4																					
	01	316 30.2	167 04.3 29.4	156 10.9 22.6	275 49.0 31.8	337 54.8 49.9	Achernar	335 21.0 S57 06.7																					
	02	331 32.6	182 07.0 28.9	171 11.9 22.0	290 51.1 31.8	352 57.4 50.0	Acruhs	173 01.7 S63 14.0																					
	03	346 35.1	197 09.8 . . 28.4	186 12.9 . . 21.4	305 53.3 . . 31.9	8 00.0 . . 50.0	Adhara	255 07.2 S29 00.1																					
	04	1 37.5	212 12.5 27.9	201 13.9 20.8	320 55.4 32.0	23 02.6 50.1	Aldebaran	290 41.2 N16 33.4																					
	05	16 40.0	227 15.3 27.4	216 15.0 20.2	335 57.6 32.1	38 05.2 50.2																							
	06	31 42.5	242 18.1 N 8 27.0	231 16.0 N 9 19.6	350 59.7 N14 32.2	53 07.8 S10 50.2	Alioth	166 14.2 N55 50.3																					
	07	46 44.9	257 20.9 26.5	246 17.0 19.0	6 01.9 32.3	68 10.4 50.3	Alkaid	152 53.0 N49 12.1																					
	08	61 47.4	272 23.6 26.0	261 18.0 18.4	21 04.0 32.4	83 12.9 50.3	Alnair	27 34.0 S46 50.7																					
	09	76 49.9	287 26.4 . . 25.5	276 19.0 . . 17.8	36 06.2 . . 32.5	98 15.5 . . 50.4	Alnilam	275 39.2 S 1 11.1																					
	10	91 52.3	302 29.2 25.0	291 20.1 17.2	51 08.3 32.5	113 18.1 50.4	Alphard	217 49.3 S 8 45.5																					
	11	106 54.8	317 32.0 24.5	306 21.1 16.6	66 10.5 32.6	128 20.7 50.5																							
	12	121 57.3	332 34.8 N 8 24.1	321 22.1 N 9 16.0	81 12.7 N14 32.7	143 23.3 S10 50.6	Alphecca	126 04.6 N26 38.3																					
	13	136 59.7	347 37.6 23.6	336 23.1 15.4	96 14.8 32.8	158 25.9 50.6	Alpheratz	357 35.8 N29 13.1																					
	14	152 02.2	2 40.4 23.1	351 24.2 14.8	111 17.0 32.9	173 28.5 50.7	Altair	62 00.8 N 8 55.9																					
	15	167 04.7	17 43.2 . . 22.6	6 25.2 . . 14.2	126 19.1 . . 33.0	188 31.1 . . 50.7	Ankaa	353 08.1 S42 10.5																					
	16	182 07.1	32 46.0 22.1	21 26.2 13.6	141 21.3 33.1	203 33.7 50.8	Antares	112 17.1 S26 29.1																					
	17	197 09.6	47 48.8 21.7	36 27.2 13.0	156 23.4 33.1	218 36.3 50.8																							
	18	212 12.0	62 51.6 N 8 21.2	51 28.3 N 9 12.4	171 25.6 N14 33.2	233 38.9 S10 50.9	Arcturus	145 49.0 N19 03.8																					
	19	227 14.5	77 54.4 20.7	66 29.3 11.8	186 27.7 33.3	248 41.4 51.0	Atria	107 12.0 S69 04.4																					
	20	242 17.0	92 57.2 20.2	81 30.3 11.2	201 29.9 33.4	263 44.0 51.0	Avior	234 15.9 S59 35.0																					
	21	257 19.4	108 00.1 . . 19.8	96 31.3 . . 10.6	216 32.1 . . 33.5	278 46.6 . . 51.1	Bellatrix	278 24.4 N 6 22.3																					
	22	272 21.9	123 02.9 19.3	111 32.3 10.0	231 34.2 33.6	293 49.2 51.1	Betelgeuse	270 53.7 N 7 24.8																					
	23	287 24.4	138 05.7 18.8	126 33.4 09.4	246 36.4 33.7	308 51.8 51.2																							
TUESDAY	25 00	302 26.8	153 08.6 N 8 18.4	141 34.4 N 9 08.8	261 38.5 N14 33.8	323 54.4 S10 51.2	Canopus	263 53.4 S52 42.3																					
	01	317 29.3	168 11.4 17.9	156 35.4 08.2	276 40.7 33.8	338 57.0 51.3	Capella	280 24.0 N46 01.2																					
	02	332 31.8	183 14.2 17.4	171 36.4 07.6	291 42.8 33.9	353 59.6 51.4	Deneb	49 26.2 N45 21.8																					
	03	347 34.2	198 17.1 . . 17.0	186 37.5 . . 07.0	306 45.0 . . 34.0	9 02.2 . . 51.4	Denebola	182 26.4 N14 26.6																					
	04	2 36.7	213 19.9 16.5	201 38.5 06.4	321 47.2 34.1	24 04.8 51.5	Diphda	348 48.4 S17 51.3																					
	05	17 39.1	228 22.8 16.1	216 39.5 05.8	336 49.3 34.2	39 07.4 51.5																							
	06	32 41.6	243 25.7 N 8 15.6	231 40.5 N 9 05.2	351 51.5 N14 34.3	54 10.0 S10 51.6	Dubhe	193 43.0 N61 37.7																					
	07	47 44.1	258 28.5 15.1	246 41.6 04.6	6 53.6 34.4	69 12.5 51.7	Elnath	278 03.7 N28 37.6																					
	08	62 46.5	273 31.4 14.7	261 42.6 04.0	21 55.8 34.4	84 15.1 51.7	Eltanin	90 42.3 N51 29.3																					
	09	77 49.0	288 34.3 . . 14.2	276 43.6 . . 03.4	36 58.0 . . 34.5	99 17.7 . . 51.8	Enif	33 39.7 N 9 59.0																					
	10	92 51.5	303 37.1 13.8	291 44.6 02.8	52 00.1 34.6	114 20.3 51.8	Fomalhaut	15 15.6 S29 29.7																					
	11	107 53.9	318 40.0 13.3	306 45.7 02.2	67 02.3 34.7	129 22.9 51.9																							
	12	122 56.4	333 42.9 N 8 12.9	321 46.7 N 9 01.6	82 04.4 N14 34.8	144 25.5 S10 51.9	Gacrux	171 53.2 S57 14.9																					
	13	137 58.9	348 45.8 12.4	336 47.7 01.0	97 06.6 34.9	159 28.1 52.0	Gienah	175 45.0 S17 40.3																					
	14	153 01.3	3 48.7 12.0	351 48.7 9 00.4	112 08.8 34.9	174 30.7 52.1	Hadar	148 37.7 S60 29.4																					
	15	168 03.8	18 51.6 . . 11.5	6 49.7 8 59.8	127 10.9 . . 35.0	189 33.3 . . 52.1	Hamal	327 52.6 N23 34.3																					
	16	183 06.3	33 54.5 11.1	21 50.8 59.2	142 13.1 35.1	204 35.9 52.2	Kaus Aust.	83 33.7 S34 22.4																					
	17	198 08.7	48 57.4 10.6	36 51.8 58.6	157 15.3 35.2	219 38.5 52.2																							
	18	213 11.2	64 00.3 N 8 10.2	51 52.8 N 8 58.0	172 17.4 N14 35.3	234 41.1 S10 52.3	Kochab	137 19.5 N74 03.8																					
	19	228 13.6	79 03.2 09.8	66 53.8 57.4	187 19.6 35.4	249 43.7 52.4	Markab	13 30.9 N15 19.9																					
	20	243 16.1	94 06.1 09.3	81 54.9 56.8	202 21.7 35.5	264 46.3 52.4	Menkar	314 07.5 N 4 11.0																					
	21	258 18.6	109 09.1 . . 08.9	96 55.9 . . 56.2	217 23.9 . . 35.5	279 48.9 . . 52.5	Menkent	147 59.0 S36 29.2																					
	22	273 21.0	124 12.0 08.4	111 56.9 55.6	232 26.1 35.6	294 51.4 52.5	Miaplacidus	221 39.5 S69 48.8																					
	23	288 23.5	139 14.9 08.0	126 57.9 55.0	247 28.2 35.7	309 54.0 52.6																							
WEDNESDAY	26 00	303 26.0	154 17.8 N 8 07.6	141 59.0 N 8 54.4	262 30.4 N14 35.8	324 56.6 S10 52.7	Mirfak	308 30.2 N49 56.5																					
	01	318 28.4	169 20.8 07.1	157 00.0 53.8	277 32.6 35.9	339 59.2 52.7	Nunki	75 48.9 S26 16.0																					
	02	333 30.9	184 23.7 06.7	172 01.0 53.2	292 34.7 36.0	355 01.8 52.8	Peacock	53 07.0 S56 39.5																					
	03	348 33.4	199 26.7 . . 06.3	187 02.0 . . 52.6	307 36.9 . . 36.0	10 04.4 . . 52.8	Pollux	243 19.2 N27 58.2																					
	04	3 35.8	214 29.6 05.8	202 03.1 51.9	322 39.1 36.1	25 07.0 52.9	Procyon	244 52.4 N 5 10.0																					
	05	18 38.3	229 32.6 05.4	217 04.1 51.3	337 41.2 36.2	40 09.6 52.9																							
	06	33 40.8	244 35.5 N 8 05.0	232 05.1 N 8 50.7	352 43.4 N14 36.3	55 12.2 S10 53.0	Rasalhague	95 59.4 N12 32.7																					
	07	48 43.2	259 38.5 04.6	247 06.1 50.1	7 45.6 36.4	70 14.8 53.1	Regulus	207 36.0 N11 51.3																					
	08	63 45.7	274 41.4 04.1	262 07.2 49.5	22 47.7 36.5	85 17.4 53.1	Rigel	281 05.3 S 8 10.3																					
	09	78 48.1	289 44.4 . . 03.7	277 08.2 . . 48.9	37 49.9 . . 36.5	100 20.0 . . 53.2	Rigel Kent.	139 41.9 S60 56.1																					
	10	93 50.6	304 47.4 03.3	292 09.2 48.3	52 52.1 36.6	115 22.6 53.2	Sabik	102 03.9 S15 45.2																					
	11	108 53.1	319 50.4 02.9	307 10.2 47.7	67 54.2 36.7	130 25.2 53.3																							
	12	123 55.5	334 53.3 N 8 02.4	322 11.2 N 8 47.1	82 56.4 N14 36.8	145 27.8 S10 53.4	Schedar	349 32.2 N56 39.7																					
	13	138 58.0	349 56.3 02.0	337 12.3 46.5	97 58.6 36.9	160 30.4 53.4	Shaula	96 11.7 S37 07.3																					
	14	154 00.5	4 59.3 01.6	352 13.3 45.9	113 00.7 37.0	175 33.0 53.5	Sirius	258 27.6 S16 44.8																					
	15	169 02.9	20 02.3 . . 01.2	7 14.3 . . 45.3	128 02.9 . . 37.0	190 35.6 . . 53.5	Spica	158 23.6 S11 17.0																					
	16	184 05.4	35 05.3 00.8	22 15.3 44.7	143 05.1 37.1	205 38.2 53.6	Suhail	222 47.6 S43 31.6																					
	17	199 07.9	50 08.3 00.4	37 16.4 44.1	158 07.2 37.2	220 40.8 53.7																							
	18	214 10.3	65 11.3 N 8 00.0	52 17.4 N 8 43.5	173 09.4 N14 37.3	235 43.4 S10 53.7	Vega	80 33.6 N38 48.4																					
	19	229 12.8	80 14.3 7 59.5	67 18.4 42.9	188 11.6 37.4	250 46.0 53.8	Zuben'ubi	136 57.3 S16 08.4																					
	20	244 15.2	95 17.3 59.1	82 19.4 42.3	203 13.7 37.5	265 48.5 53.8																							
	21	259 17.7	110 20.3 . . 58.7	97 20.5 . . 41.7	218 15.9 . . 37.5	280 51.1 . . 53.9																							
	22	274 20.2	125 23.4 58.3	112 21.5 41.1	233 18.1 37.6	295 53.7 54.0	Venus	210 41.7 13 45																					
	23	289 22.6	140 26.4 57.9	127 22.5 40.4	248 20.2 37.7	310 56.3 54.0	Mars	199 07.6 14 33																					
							Jupiter	319 11.7 6 32																					
							Saturn	21 27.6 2 24																					
Mer. Pass. 3 49.6														v	2.9	d	0.5	v	1.0	d	0.6	v	2.2	d	0.1	v	2.6	d	0.1

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise												
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	24	25	26	27							
	°	'			°	'													°	'					
MONDAY	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m					
	24	00	178	21.8	N19	57.6	112	27.5	16.7	S	2	00.2	14.2	54.8	N	72				11 51	14 01	17 01			
	01	193	21.8		57.1	127	03.2	16.6				2	14.4	14.2	54.9	N	70				11 44	13 41	16 04		
	02	208	21.8		56.6	141	38.8	16.6				2	28.6	14.1	54.9	68	////	////	01 33	11 38	13 26	15 31	18 51		
	03	223	21.8		56.1	156	14.4	16.6				2	42.7	14.2	54.9	66	////	////	02 17	11 33	13 14	15 07	17 24		
	04	238	21.8		55.6	170	50.0	16.5				2	56.9	14.2	54.9	64	////	00 40	02 45	11 29	13 04	14 48	16 47		
	05	253	21.7		55.0	185	25.5	16.5				3	11.1	14.1	54.9	62	////	01 44	03 07	11 25	12 56	14 33	16 21		
	06	268	21.7	N19	54.5	200	01.0	16.5	S	3	25.2	14.2	55.0	60	////	02 17	03 24	03 24	11 22	12 48	14 20	16 00			
	07	283	21.7		54.0	214	36.5	16.5				3	39.4	14.1	55.0	N	58	00 37	02 40	03 38	11 20	12 42	14 10	15 44	
	08	298	21.7		53.5	229	12.0	16.4				3	53.5	14.2	55.0	56	01 35	02 59	03 51	11 17	12 36	14 00	15 30		
	09	313	21.7		52.9	243	47.4	16.3				4	07.7	14.1	55.0	54	02 05	03 14	04 01	11 15	12 31	13 52	15 17		
	10	328	21.7		52.4	258	22.7	16.4				4	21.8	14.2	55.1	52	02 27	03 28	04 11	11 13	12 27	13 45	15 07		
	11	343	21.7		51.9	272	58.1	16.3				4	36.0	14.1	55.1	50	02 45	03 39	04 19	11 11	12 23	13 38	14 57		
	12	358	21.7	N19	51.4	287	33.4	16.2	S	4	50.1	14.2	55.1	45	03 18	04 02	04 37	04 37	11 07	12 14	13 24	14 38			
	13	13	21.6		50.8	302	08.6	16.2				5	04.3	14.1	55.1	N	40	03 42	04 21	04 52	11 04	12 07	13 12	14 22	
	14	28	21.6		50.3	316	43.8	16.2				5	18.4	14.1	55.2	35	04 01	04 36	05 04	11 02	12 01	13 02	14 08		
	15	43	21.6		49.8	331	19.0	16.1				5	32.5	14.1	55.2	30	04 17	04 48	05 15	10 59	11 55	12 54	13 57		
	16	58	21.6		49.3	345	54.1	16.1				5	46.6	14.1	55.2	20	04 41	05 09	05 33	10 55	11 46	12 39	13 37		
	17	73	21.6		48.7	0	29.2	16.0				6	00.7	14.1	55.2	N	10	05 00	05 26	05 48	10 52	11 38	12 26	13 20	
	18	88	21.6	N19	48.2	15	04.2	16.0	S	6	14.8	14.1	55.3	0	05 16	05 41	06 03	06 03	10 48	11 30	12 15	13 04			
	19	103	21.6		47.7	29	39.2	15.9				6	28.9	14.1	55.3	S	10	05 29	05 55	06 17	10 45	11 22	12 03	12 48	
	20	118	21.6		47.1	44	14.1	15.9				6	43.0	14.0	55.3	20	05 43	06 09	06 33	10 41	11 14	11 50	12 31		
	21	133	21.6		46.6	58	49.0	15.8				6	57.0	14.1	55.3	30	05 55	06 25	06 50	10 38	11 05	11 36	12 12		
	22	148	21.5		46.1	73	23.8	15.8				7	11.1	14.0	55.4	35	06 02	06 33	07 00	10 35	11 00	11 28	12 01		
	23	163	21.5		45.6	87	58.6	15.7				7	25.1	14.0	55.4	40	06 09	06 42	07 12	10 33	10 54	11 19	11 48		
	TUESDAY	25	00	178	21.5	N19	45.0	102	33.3	15.6	S	7	39.1	14.0	55.4	45	06 17	06 53	07 25	10 30	10 48	11 08	11 33		
01		193	21.5		44.5	117	07.9	15.6				7	53.1	14.0	55.4	S	50	06 26	07 05	07 41	10 26	10 40	10 55	11 15	
02		208	21.5		44.0	131	42.5	15.6				8	07.1	13.9	55.5	52	06 29	07 11	07 49	10 25	10 36	10 49	11 07		
03		223	21.5		43.4	146	17.1	15.4				8	21.0	14.0	55.5	54	06 33	07 17	07 58	10 23	10 32	10 43	10 57		
04		238	21.5		42.9	160	51.5	15.4				8	35.0	13.9	55.5	56	06 38	07 24	08 07	10 21	10 27	10 35	10 46		
05		253	21.5		42.4	175	25.9	15.4				8	48.9	13.9	55.6	58	06 42	07 32	08 18	10 19	10 22	10 27	10 34		
06		268	21.5	N19	41.8	190	00.3	15.3	S	9	02.8	13.9	55.6	S	60	06 48	07 40	08 31	10 17	10 17	10 18	10 20			
07		283	21.5		41.3	204	34.6	15.2				9	16.7	13.8	55.6	Lat.		Twilight		Moonset					
08		298	21.5		40.7	219	08.8	15.2				9	30.5	13.9	55.6	Sunset		Civil		Naut.		24	25	26	27
09		313	21.5		40.2	233	43.0	15.0				9	44.4	13.8	55.7										
10		328	21.5		39.7	248	17.0	15.1				9	58.2	13.8	55.7										
11		343	21.4		39.1	262	51.1	14.9				10	12.0	13.7	55.7										
12		358	21.4	N19	38.6	277	25.0	14.9	S10	10	25.7	13.7	55.8	N	72				21 34	20 53	19 28				
13		13	21.4		38.1	291	58.9	14.8				10	39.4	13.7	55.8	N	70				21 44	21 15	20 26		
14		28	21.4		37.5	306	32.7	14.7				10	53.1	13.7	55.8	68	22 34	////	////	21 53	21 31	21 01	19 25		
15		43	21.4		37.0	321	06.4	14.7				11	06.8	13.7	55.8	66	21 26	23 21	////	22 00	21 45	21 27	20 53		
16		58	21.4		36.4	335	40.1	14.5				11	20.5	13.6	55.9	64	21 05	22 25	////	22 05	21 57	21 46	21 31		
17		73	21.4		35.9	350	13.6	14.5				11	34.1	13.5	55.9	62	21 05	22 25	////	22 11	22 07	22 03	21 58		
18		88	21.4	N19	35.3	4	47.1	14.4	S11	11	47.6	13.6	55.9	60	20 48	21 54	////	////	22 15	22 15	22 16	22 20			
19		103	21.4		34.8	19	20.5	14.4				12	01.2	13.5	56.0	N	58	20 33	21 31	23 26	22 19	22 23	22 28	22 37	
20		118	21.4		34.3	33	53.9	14.2				12	14.7	13.5	56.0	56	20 21	21 12	22 35	22 23	22 29	22 38	22 52		
21		133	21.4		33.7	48	27.1	14.2				12	28.2	13.4	56.0	54	20 11	20 57	22 06	22 26	22 35	22 47	23 04		
22		148	21.4		33.2	63	00.3	14.1				12	41.6	13.4	56.1	52	20 01	20 44	21 44	22 29	22 41	22 55	23 16		
23		163	21.4		32.6	77	33.4	14.0				12	55.0	13.3	56.1	50	19 53	20 33	21 27	22 31	22 45	23 03	23 26		
WEDNESDAY		26	00	178	21.4	N19	32.1	92	06.4	13.9	S13	13	08.3	13.3	56.1	45	19 35	20 10	20 54	22 37	22 56	23 18	23 47		
		01	193	21.4		31.5	106	39.3	13.8				13	21.6	13.3	56.2	N	40	19 21	19 52	20 30	22 42	23 05	23 31	24 04
	02	208	21.4		31.0	121	12.1	13.7				13	34.9	13.2	56.2	35	19 09	19 37	20 11	22 46	23 12	23 42	24 18		
	03	223	21.4		30.4	135	44.8	13.6				13	48.1	13.2	56.2	30	18 58	19 24	19 56	22 50	23 19	23 52	24 31		
	04	238	21.4		29.9	150	17.4	13.6				14	01.3	13.2	56.3	20	18 40	19 04	19 32	22 57	23 31	24 09	00 09		
	05	253	21.4		29.3	164	50.0	13.4				14	14.5	13.1	56.3	N	10	18 25	18 47	19 13	23 02	23 41	24 24	00 24	
	06	268	21.4	N19	28.8	179	22.4	13.4	S14	14	27.6	13.0	56.3	0	18 10	18 32	18 58	23 08	23 51	24 37	00 37				
	07	283	21.4		28.2	193	54.8	13.2				14	40.6	13.0	56.4	S	10	17 56	18 18	18 44	23 13	24 01	00 01	00 51	
	08	298	21.4		27.7	208	27.0	13.2				14	53.6	13.0	56.4	20	17 41	18 04	18 31	23 19	24 11	00 11	01 06		
	09	313	21.4		27.1	222	59.2	13.0				15	06.6	12.9	56.4	30	17 23	17 49	18 18	23 26	24 23	00 23	01 23		
	10	328	21.4		26.6	237	31.2	13.0				15	19.5	12.8	56.5	35	17 13	17 40	18 11	23 30	24 30	00 30	01 33		
	11	343	21.4		26.0	252	03.2	12.8																	

UT	ARIES		VENUS −4.5		MARS +1.8		JUPITER −2.3		SATURN +0.5		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
d h	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /		° /	° /
T H U R S D A Y	27 00	304 25.1	155 29.4 N 7 57.5		142 23.5 N 8 39.8		263 22.4 N14 37.8		325 58.9 S10 54.1		Acamar	315 12.8 S40 12.3	
	01	319 27.6	170 32.4	57.1	157 24.6	39.2	278 24.6	37.9	341 01.5	54.1	Achernar	335 21.0 S57 06.7	
	02	334 30.0	185 35.5	56.7	172 25.6	38.6	293 26.7	37.9	356 04.1	54.2	Acrux	173 01.7 S63 14.0	
	03	349 32.5	200 38.5	56.3	187 26.6	38.0	308 28.9	38.0	11 06.7	54.3	Adhara	255 07.2 S29 00.1	
	04	4 35.0	215 41.6	55.9	202 27.6	37.4	323 31.1	38.1	26 09.3	54.3	Aldebaran	290 41.2 N16 33.4	
	05	19 37.4	230 44.6	55.5	217 28.7	36.8	338 33.3	38.2	41 11.9	54.4			
	06	34 39.9	245 47.7 N 7 55.1		232 29.7 N 8 36.2		353 35.4 N14 38.3		56 14.5 S10 54.4		Alioth	166 14.2 N55 50.3	
	07	49 42.4	260 50.7	54.7	247 30.7	35.6	8 37.6	38.4	71 17.1	54.5	Alkaid	152 53.0 N49 12.1	
	08	64 44.8	275 53.8	54.3	262 31.7	35.0	23 39.8	38.4	86 19.7	54.6	Alnair	27 34.0 S46 50.7	
	09	79 47.3	290 56.8	54.0	277 32.8	34.4	38 41.9	38.5	101 22.3	54.6	Alnilam	275 39.2 S 1 11.1	
	10	94 49.7	305 59.9	53.6	292 33.8	33.8	53 44.1	38.6	116 24.9	54.7	Alphard	217 49.3 S 8 45.5	
	11	109 52.2	321 03.0	53.2	307 34.8	33.2	68 46.3	38.7	131 27.5	54.7			
	12	124 54.7	336 06.0 N 7 52.8		322 35.8 N 8 32.6		83 48.5 N14 38.8		146 30.1 S10 54.8		Alphecca	126 04.6 N26 38.3	
	13	139 57.1	351 09.1	52.4	337 36.8	32.0	98 50.6	38.8	161 32.7	54.9	Alpheratz	357 35.8 N29 13.1	
	14	154 59.6	6 12.2	52.0	352 37.9	31.3	113 52.8	38.9	176 35.3	54.9	Altair	62 00.8 N 8 55.9	
	15	170 02.1	21 15.3	51.6	7 38.9	30.7	128 55.0	39.0	191 37.9	55.0	Ankaa	353 08.1 S42 10.5	
	16	185 04.5	36 18.4	51.3	22 39.9	30.1	143 57.2	39.1	206 40.5	55.0	Antares	112 17.1 S26 29.1	
	17	200 07.0	51 21.5	50.9	37 40.9	29.5	158 59.3	39.2	221 43.1	55.1			
	18	215 09.5	66 24.6 N 7 50.5		52 42.0 N 8 28.9		174 01.5 N14 39.2		236 45.7 S10 55.2		Arcturus	145 49.0 N19 03.8	
	19	230 11.9	81 27.7	50.1	67 43.0	28.3	189 03.7	39.3	251 48.3	55.2	Atria	107 12.0 S69 04.4	
	20	245 14.4	96 30.8	49.7	82 44.0	27.7	204 05.9	39.4	266 50.9	55.3	Avior	234 15.9 S59 35.0	
	21	260 16.9	111 33.9	49.4	97 45.0	27.1	219 08.0	39.5	281 53.5	55.3	Bellatrix	278 24.4 N 6 22.3	
	22	275 19.3	126 37.0	49.0	112 46.1	26.5	234 10.2	39.6	296 56.1	55.4	Betelgeuse	270 53.7 N 7 24.8	
	23	290 21.8	141 40.1	48.6	127 47.1	25.9	249 12.4	39.6	311 58.7	55.5			
F R I D A Y	28 00	305 24.2	156 43.2 N 7 48.3		142 48.1 N 8 25.3		264 14.6 N14 39.7		327 01.3 S10 55.5		Canopus	263 53.4 S52 42.3	
	01	320 26.7	171 46.4	47.9	157 49.1	24.7	279 16.7	39.8	342 03.9	55.6	Capella	280 24.0 N46 01.2	
	02	335 29.2	186 49.5	47.5	172 50.2	24.0	294 18.9	39.9	357 06.5	55.6	Deneb	49 26.2 N45 21.8	
	03	350 31.6	201 52.6	47.2	187 51.2	23.4	309 21.1	40.0	12 09.1	55.7	Denebola	182 26.4 N14 26.6	
	04	5 34.1	216 55.8	46.8	202 52.2	22.8	324 23.3	40.0	27 11.7	55.8	Diphda	348 48.4 S17 51.3	
	05	20 36.6	231 58.9	46.4	217 53.2	22.2	339 25.4	40.1	42 14.3	55.8			
	06	35 39.0	247 02.1 N 7 46.1		232 54.3 N 8 21.6		354 27.6 N14 40.2		57 16.9 S10 55.9		Dubhe	193 43.0 N61 37.7	
	07	50 41.5	262 05.2	45.7	247 55.3	21.0	9 29.8	40.3	72 19.5	55.9	Elmath	278 03.7 N28 37.6	
	08	65 44.0	277 08.4	45.3	262 56.3	20.4	24 32.0	40.4	87 22.1	56.0	Eltanin	90 42.3 N51 29.3	
	09	80 46.4	292 11.5	45.0	277 57.3	19.8	39 34.2	40.4	102 24.7	56.1	Enif	33 39.7 N 9 59.0	
	10	95 48.9	307 14.7	44.6	292 58.4	19.2	54 36.3	40.5	117 27.3	56.1	Fomalhaut	15 15.5 S29 29.7	
	11	110 51.4	322 17.8	44.3	307 59.4	18.6	69 38.5	40.6	132 29.9	56.2			
	12	125 53.8	337 21.0 N 7 43.9		323 00.4 N 8 17.9		84 40.7 N14 40.7		147 32.5 S10 56.2		Gacrux	171 53.3 S57 14.9	
	13	140 56.3	352 24.2	43.6	338 01.4	17.3	99 42.9	40.8	162 35.1	56.3	Gienah	175 45.0 S17 40.3	
	14	155 58.7	7 27.4	43.2	353 02.5	16.7	114 45.1	40.8	177 37.7	56.4	Hadar	148 37.7 S60 29.4	
	15	171 01.2	22 30.5	42.9	8 03.5	16.1	129 47.2	40.9	192 40.3	56.4	Hamal	327 52.5 N23 34.3	
	16	186 03.7	37 33.7	42.5	23 04.5	15.5	144 49.4	41.0	207 42.9	56.5	Kaus Aust.	83 33.7 S34 22.4	
	17	201 06.1	52 36.9	42.2	38 05.5	14.9	159 51.6	41.1	222 45.5	56.6			
	18	216 08.6	67 40.1 N 7 41.8		53 06.6 N 8 14.3		174 53.8 N14 41.1		237 48.1 S10 56.6		Kochab	137 19.6 N74 03.8	
	19	231 11.1	82 43.3	41.5	68 07.6	13.7	189 56.0	41.2	252 50.7	56.7	Markab	13 30.8 N15 19.9	
	20	246 13.5	97 46.5	41.2	83 08.6	13.1	204 58.1	41.3	267 53.3	56.7	Menkar	314 07.5 N 4 11.0	
	21	261 16.0	112 49.7	40.8	98 09.6	12.5	220 00.3	41.4	282 55.9	56.8	Menkent	147 59.1 S36 29.2	
	22	276 18.5	127 52.9	40.5	113 10.7	11.8	235 02.5	41.5	297 58.5	56.9	Miaplacidus	221 39.5 S69 48.8	
	23	291 20.9	142 56.1	40.1	128 11.7	11.2	250 04.7	41.5	313 01.1	56.9			
S A T U R D A Y	29 00	306 23.4	157 59.3 N 7 39.8		143 12.7 N 8 10.6		265 06.9 N14 41.6		328 03.7 S10 57.0		Mirfak	308 30.1 N49 56.5	
	01	321 25.9	173 02.6	39.5	158 13.7	10.0	280 09.0	41.7	343 06.3	57.0	Nunki	75 48.9 S26 16.0	
	02	336 28.3	188 05.8	39.1	173 14.7	09.4	295 11.2	41.8	358 08.9	57.1	Peacock	53 07.0 S56 39.5	
	03	351 30.8	203 09.0	38.8	188 15.8	08.8	310 13.4	41.8	13 11.5	57.2	Pollux	243 19.1 N27 58.2	
	04	6 33.2	218 12.2	38.5	203 16.8	08.2	325 15.6	41.9	28 14.1	57.2	Procyon	244 52.4 N 5 10.0	
	05	21 35.7	233 15.5	38.1	218 17.8	07.6	340 17.8	42.0	43 16.7	57.3			
	06	36 38.2	248 18.7 N 7 37.8		233 18.8 N 8 06.9		355 20.0 N14 42.1		58 19.3 S10 57.4		Rasalhague	95 59.4 N12 32.7	
	07	51 40.6	263 21.9	37.5	248 19.9	06.3	10 22.1	42.2	73 21.9	57.4	Regulus	207 36.0 N11 51.3	
	08	66 43.1	278 25.2	37.2	263 20.9	05.7	25 24.3	42.2	88 24.5	57.5	Rigel	281 05.3 S 8 10.3	
	09	81 45.6	293 28.4	36.8	278 21.9	05.1	40 26.5	42.3	103 27.2	57.5	Rigel Kent.	139 41.9 S60 56.1	
	10	96 48.0	308 31.7	36.5	293 22.9	04.5	55 28.7	42.4	118 29.8	57.6	Sabik	102 03.9 S15 45.2	
	11	111 50.5	323 34.9	36.2	308 24.0	03.9	70 30.9	42.5	133 32.4	57.7			
	12	126 53.0	338 38.2 N 7 35.9		323 25.0 N 8 03.3		85 33.1 N14 42.5		148 35.0 S10 57.7		Schedar	349 32.2 N56 39.7	
	13	141 55.4	353 41.5	35.6	338 26.0	02.7	100 35.3	42.6	163 37.6	57.8	Shaula	96 11.7 S37 07.3	
	14	156 57.9	8 44.7	35.3	353 27.0	02.1	115 37.4	42.7	178 40.2	57.8	Sirius	258 27.6 S16 44.8	
	15	172 00.3	23 48.0	34.9	8 28.1	01.4	130 39.6	42.8	193 42.8	57.9	Spica	158 23.6 S11 17.0	
	16	187 02.8	38 51.3	34.6	23 29.1	00.8	145 41.8	42.8	208 45.4	58.0	Suhail	222 47.6 S43 31.6	
	17	202 05.3	53 54.6	34.3	38 30.1	8 00.2	160 44.0	42.9	223 48.0	58.0			
	18	217 07.7	68 57.8 N 7 34.0		53 31.1 N 7 59.6		175 46.2 N14 43.0		238 50.6 S10 58.1		Vega	80 33.6 N38 48.4	
	19	232 10.2	84 01.1	33.7	68 32.2	59.0	190 48.4	43.1	253 53.2	58.2	Zuben'ubi	136 57.3 S16 08.4	
	20	247 12.7	99 04.4	33.4	83 33.2	58.4	205 50.6	43.2	268 55.8	58.2			
	21	262 15.1	114 07.7	33.1	98 34.2	57.8	220 52.7	43.2	283 58.4	58.3			
	22	277 17.6	129 11.0	32.8	113 35.2	57.1	235 54.9	43.3	299 01.0	58.3	Venus	211 19.0 h 13 30 m	
	23	292 20.1	144 14.3	32.5	128 36.3	56.5	250 57.1	43.4	314 03.6	58.4	Mars	197 23.9 h 14 28 m	
											Jupiter	318 50.3 h 6 22 m	
											Saturn	21 37.1 h 2 12 m	
Mer. Pass. 3 37.8			v 3.2 d 0.4		v 1.0 d 0.6		v 2.2 d 0.1		v 2.6 d 0.1				

UT	SUN			MOON					Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec		GHA	v	Dec	d	HP		Naut.	Civil		27	28	29	30
d h	° ′	° ′		° ′	° ′	° ′	° ′	° ′	°	h m	h m	h m	h m	h m	h m	h m
27	00	178 21.4	N19 18.8	80 48.9	11.4	S18 13.8	12.0	57.0	N 72							
	01	193 21.4	18.3	95 19.3	11.3	18 25.8	11.9	57.0	N 70	////	////	00 28				
	02	208 21.4	17.7	109 49.6	11.2	18 37.7	11.8	57.1	68	////	////	01 52	18 51			
	03	223 21.4	17.1	124 19.8	11.1	18 49.5	11.7	57.1	66	////	////	02 29	17 24			
	04	238 21.4	16.6	138 49.9	10.9	19 01.2	11.7	57.1	64	////	01 11	02 54	16 47	19 24		
	05	253 21.4	16.0	153 19.8	10.9	19 12.9	11.6	57.2	62	////	01 57	03 14	16 21	18 21	20 37	21 56
	06	268 21.4	N19 15.5	167 49.7	10.7	S19 24.5	11.5	57.2	60	////	02 26	03 31	16 00	17 47	19 30	20 41
	07	283 21.4	14.9	182 19.4	10.5	19 36.0	11.4	57.2	N 58	01 04	02 48	03 44	15 44	17 22	18 55	20 05
	08	298 21.4	14.3	196 48.9	10.5	19 47.4	11.3	57.3	56	01 47	03 06	03 56	15 30	17 02	18 30	19 39
	09	313 21.5	13.8	211 18.4	10.3	19 58.7	11.2	57.3	54	02 14	03 20	04 06	15 17	16 46	18 10	19 18
T H U R S D A Y	10	328 21.5	13.2	225 47.7	10.2	20 09.9	11.2	57.4	52	02 34	03 33	04 15	15 07	16 32	17 53	19 02
	11	343 21.5	12.6	240 16.9	10.1	20 21.1	11.1	57.4	50	02 51	03 44	04 23	14 57	16 19	17 38	18 46
	12	358 21.5	N19 12.1	254 46.0	10.0	S20 32.2	10.9	57.4	45	03 22	04 06	04 40	14 38	15 54	17 09	18 16
	13	13 21.5	11.5	269 15.0	9.8	20 43.1	10.9	57.5	N 40	03 46	04 24	04 54	14 22	15 34	16 46	17 53
	14	28 21.5	10.9	283 43.8	9.7	20 54.0	10.8	57.5	35	04 04	04 38	05 06	14 08	15 17	16 27	17 34
	15	43 21.5	10.4	298 12.5	9.6	21 04.8	10.7	57.6	30	04 19	04 50	05 16	13 57	15 03	16 11	17 17
	16	58 21.5	09.8	312 41.1	9.4	21 15.5	10.5	57.6	20	04 42	05 10	05 34	13 37	14 38	15 43	16 49
	17	73 21.5	09.2	327 09.5	9.3	21 26.0	10.5	57.6	N 10	05 01	05 27	05 49	13 20	14 18	15 20	16 25
	18	88 21.5	N19 08.7	341 37.8	9.2	S21 36.5	10.4	57.7	0	05 16	05 41	06 03	13 04	13 58	14 58	16 03
	19	103 21.5	08.1	356 06.0	9.0	21 46.9	10.3	57.7	S 10	05 29	05 55	06 17	12 48	13 39	14 37	15 40
F R I D A Y	20	118 21.5	07.5	10 34.0	8.9	21 57.2	10.2	57.8	20	05 42	06 08	06 32	12 31	13 18	14 13	15 16
	21	133 21.6	07.0	25 01.9	8.8	22 07.4	10.0	57.8	30	05 54	06 23	06 48	12 12	12 55	13 46	14 48
	22	148 21.6	06.4	39 29.7	8.7	22 17.4	10.0	57.8	35	06 00	06 31	06 58	12 01	12 41	13 31	14 32
	23	163 21.6	05.8	53 57.4	8.5	22 27.4	9.8	57.9	40	06 07	06 40	07 09	11 48	12 25	13 12	14 12
	28 00	178 21.6	N19 05.2	68 24.9	8.3	S22 37.2	9.8	57.9	45	06 14	06 50	07 22	11 33	12 06	12 50	13 49
	01	193 21.6	04.7	82 52.2	8.3	22 47.0	9.6	57.9	S 50	06 22	07 02	07 38	11 15	11 43	12 22	13 19
	02	208 21.6	04.1	97 19.5	8.1	22 56.6	9.5	58.0	52	06 26	07 07	07 45	11 07	11 31	12 09	13 05
	03	223 21.6	03.5	111 46.6	8.0	23 06.1	9.4	58.0	54	06 30	07 13	07 53	10 57	11 19	11 53	12 48
	04	238 21.6	02.9	126 13.6	7.8	23 15.5	9.3	58.1	56	06 34	07 20	08 02	10 46	11 04	11 35	12 27
	05	253 21.6	02.4	140 40.4	7.7	23 24.8	9.1	58.1	58	06 38	07 27	08 12	10 34	10 47	11 12	12 02
S A T U R D A Y	06	268 21.6	N19 01.8	155 07.1	7.6	S23 33.9	9.0	58.2	S 60	06 43	07 35	08 24	10 20	10 27	10 43	11 27
	07	283 21.7	01.2	169 33.7	7.4	23 42.9	8.9	58.2	Lat.		Twilight		Moonset			
	08	298 21.7	00.6	184 00.1	7.3	23 51.8	8.8	58.2	Sunset	Civil	Naut.	27	28	29	30	
	09	313 21.7	19 00.1	198 26.4	7.2	24 00.6	8.6	58.3				h m	h m	h m	h m	
	10	328 21.7	18 59.5	212 52.6	7.0	24 09.2	8.5	58.3	N 72	h m	h m	h m	h m	h m	h m	h m
	11	343 21.7	58.9	227 18.6	7.0	24 17.7	8.4	58.4	N 70							
	12	358 21.7	N18 58.3	241 44.6	6.7	S24 26.1	8.2	58.4	68	23 25	////	////				
	13	13 21.7	57.8	256 10.3	6.7	24 34.3	8.1	58.4	66	22 17	////	////	19 25			
	14	28 21.8	57.2	270 36.0	6.5	24 42.4	8.0	58.5	64	21 41	////	////	20 53			
	15	43 21.8	56.6	285 01.5	6.3	24 50.4	7.8	58.5	62	21 16	22 56	////	21 31	20 50		
S U N D A Y	16	58 21.8	56.0	299 26.8	6.3	24 58.2	7.7	58.6	60	20 57	22 12	////	21 58	21 54	21 46	22 43
	17	73 21.8	55.4	313 52.1	6.1	25 05.9	7.5	58.6	60	20 41	21 44	////	22 20	22 28	22 53	23 58
	18	88 21.8	N18 54.8	328 17.2	6.0	S25 13.4	7.4	58.6	N 58	20 27	21 23	23 03	22 37	22 54	23 28	24 34
	19	103 21.8	54.3	342 42.2	5.8	25 20.8	7.2	58.7	56	20 16	21 06	22 23	22 52	23 14	23 53	25 00
	20	118 21.8	53.7	357 07.0	5.7	25 28.0	7.1	58.7	54	20 06	20 51	21 57	23 04	23 31	24 14	00 14
	21	133 21.9	53.1	11 31.7	5.6	25 35.1	7.0	58.8	52	19 57	20 39	21 37	23 16	23 45	24 31	00 31
	22	148 21.9	52.5	25 56.3	5.5	25 42.1	6.7	58.8	50	19 49	20 28	21 21	23 26	23 58	24 46	00 46
	23	163 21.9	51.9	40 20.8	5.3	25 48.8	6.7	58.8	45	19 32	20 06	20 50	23 47	24 24	00 24	01 15
	29 00	178 21.9	N18 51.3	54 45.1	5.2	S25 55.5	6.4	58.9	N 40	19 18	19 49	20 27	24 04	00 04	00 45	01 39
	01	193 21.9	50.8	69 09.3	5.1	26 01.9	6.3	58.9	35	19 06	19 35	20 09	24 18	00 18	01 03	01 58
02	208 21.9	50.2	83 33.4	5.0	26 08.2	6.2	59.0	30	18 56	19 22	19 54	24 31	00 31	01 18	02 14	
03	223 22.0	49.6	97 57.4	4.9	26 14.4	6.0	59.0	20	18 39	19 03	19 31	00 09	00 52	01 43	02 42	
04	238 22.0	49.0	112 21.3	4.7	26 20.4	5.8	59.0	N 10	18 24	18 46	19 12	00 24	01 11	02 05	03 06	
05	253 22.0	48.4	126 45.0	4.6	26 26.2	5.6	59.1	0	18 10	18 32	18 57	00 37	01 29	02 26	03 29	
06	268 22.0	N18 47.8	141 08.6	4.5	S26 31.8	5.5	59.1	S 10	17 56	18 18	18 44	00 51	01 47	02 47	03 51	
07	283 22.0	47.2	155 32.1	4.4	26 37.3	5.3	59.1	20	17 42	18 05	18 32	01 06	02 06	03 09	04 15	
08	298 22.1	46.6	169 55.5	4.2	26 42.6	5.2	59.2	30	17 25	17 50	18 19	01 23	02 28	03 35	04 43	
09	313 22.1	46.1	184 18.7	4.2	26 47.8	4.9	59.2	35	17 15	17 42	18 13	01 33	02 41	03 50	04 59	
10	328 22.1	45.5	198 41.9	4.0	26 52.7	4.8	59.3	40	17 04	17 34	18 06	01 45	02 56	04 08	05 18	
11	343 22.1	44.9	213 04.9	3.9	26 57.5	4.6	59.3	45	16 52	17 24	17 59	01 59	03 14	04 30	05 42	
12	358 22.1	N18 44.3	227 27.8	3.8	S27 02.1	4.5	59.3	S 50	16 36	17 12	17 51	02 15	03 36	04 57	06 11	
13	13 22.2	43.7	241 50.6	3.8	27 06.6	4.2	59.4	52	16 29	17 06	17 48	02 23	03 47	05 10	06 26	
14	28 22.2	43.1	256 13.4	3.6	27 10.8	4.1	59.4	54	16 21	17 01	17 44	02 32	03 59	05 26	06 43	
15	43 22.2	42.5	270 36.0	3.5	27 14.9	3.9	59.5	56	16 12	16 54	17 40	02 42	04 13	05 44	07 03	
16	58 22.2	41.9	284 58.5	3.4	27 18.8	3.7	59.5	58	16 01	16 47	17 36	02 53	04 29	06 06	07 29	
17	73 22.2	41.3	299 20.9	3.3	27 22.5	3.5	59.5	S 60	15 49	16 39	17 31	03 07	04 49	06 35	08 04	
18	88 22.3	N18 40.7	313 43.2	3.2	S27 26.0	3.3	59.6	Day	SUN		MOON					
19	103 22.3	40.1	328 05.4	3.2	27 29.3	3.2	59.6		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
20	118 22.3	39.5	342 27.6	3.0	27 32.5	2.9	59.6	00 ^h			12 ^h	Pass.			Upper	Lower
21	133 22.3	38.9	356 49.6	3.0	27 35.4	2.8	59.7	d	m s	m s	h m	h m	h m	d	%	

UT	ARIES		VENUS -4.4		MARS +1.8		JUPITER -2.4		SATURN +0.5		STARS			
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
SUNDAY	30 00	307 22.5	159 17.6 N 7 32.2	143 37.3 N 7 55.9	265 59.3 N14 43.5	329 06.2 S10 58.5	Acamar	315 12.7	S40 12.3					
	01	322 25.0	174 20.9	31.9	158 38.3	55.3	281 01.5	43.5	344 08.8	58.5	Achernar	335 20.9	S57 06.7	
	02	337 27.5	189 24.2	31.6	173 39.3	54.7	296 03.7	43.6	359 11.4	58.6	Acruax	173 01.8	S63 14.0	
	03	352 29.9	204 27.6	31.3	188 40.4	54.1	311 05.9	43.7	14 14.0	58.7	Adhara	255 07.2	S29 00.1	
	04	7 32.4	219 30.9	31.0	203 41.4	53.5	326 08.1	43.8	29 16.6	58.7	Aldebaran	290 41.2	N16 33.4	
	05	22 34.8	234 34.2	30.7	218 42.4	52.9	341 10.3	43.8	44 19.2	58.8				
	06	37 37.3	249 37.5 N 7 30.4	233 43.4 N 7 52.2	356 12.4 N14 43.9	59 21.8 S10 58.8	Alioth	166 14.2	N55 50.2					
	07	52 39.8	264 40.9	30.1	248 44.5	51.6	11 14.6	44.0	74 24.4	58.9	Alkaid	152 53.0	N49 12.1	
	08	67 42.2	279 44.2	29.8	263 45.5	51.0	26 16.8	44.1	89 27.1	59.0	Alnair	27 34.0	S46 50.7	
	09	82 44.7	294 47.5	29.6	278 46.5	50.4	41 19.0	44.1	104 29.7	59.0	Alnilam	275 39.2	S 1 11.1	
	10	97 47.2	309 50.9	29.3	293 47.5	49.8	56 21.2	44.2	119 32.3	59.1	Alphard	217 49.2	S 8 45.5	
	11	112 49.6	324 54.2	29.0	308 48.6	49.2	71 23.4	44.3	134 34.9	59.2				
	12	127 52.1	339 57.6 N 7 28.7	323 49.6 N 7 48.6	86 25.6 N14 44.4	149 37.5 S10 59.2	Alphecca	126 04.6	N26 38.3					
	13	142 54.6	355 00.9	28.4	338 50.6	47.9	101 27.8	44.4	164 40.1	59.3	Alpheratz	357 35.8	N29 13.1	
	14	157 57.0	10 04.3	28.1	353 51.6	47.3	116 30.0	44.5	179 42.7	59.3	Altair	62 00.8	N 8 55.9	
	15	172 59.5	25 07.7	27.9	8 52.7	46.7	131 32.2	44.6	194 45.3	59.4	Ankaa	353 08.1	S42 10.5	
	16	188 02.0	40 11.0	27.6	23 53.7	46.1	146 34.4	44.7	209 47.9	59.5	Antares	112 17.1	S26 29.1	
	17	203 04.4	55 14.4	27.3	38 54.7	45.5	161 36.6	44.7	224 50.5	59.5				
	18	218 06.9	70 17.8 N 7 27.1	53 55.7 N 7 44.9	176 38.7 N14 44.8	239 53.1 S10 59.6	Arcturus	145 49.0	N19 03.8					
	19	233 09.3	85 21.1	26.8	68 56.8	44.2	191 40.9	44.9	254 55.7	59.7	Atria	107 12.0	S69 04.4	
	20	248 11.8	100 24.5	26.5	83 57.8	43.6	206 43.1	44.9	269 58.3	59.7	Avior	234 15.9	S59 35.0	
	21	263 14.3	115 27.9	26.2	98 58.8	43.0	221 45.3	45.0	285 00.9	59.8	Bellatrix	278 24.4	N 6 22.3	
	22	278 16.7	130 31.3	26.0	113 59.8	42.4	236 47.5	45.1	300 03.5	59.8	Betelgeuse	270 53.6	N 7 24.8	
	23	293 19.2	145 34.7	25.7	129 00.9	41.8	251 49.7	45.2	315 06.1	59.9				
MONDAY	31 00	308 21.7	160 38.1 N 7 25.4	144 01.9 N 7 41.2	266 51.9 N14 45.2	330 08.8 S11 00.0	Canopus	263 53.4	S52 42.2					
	01	323 24.1	175 41.5	25.2	159 02.9	40.6	281 54.1	45.3	345 11.4	00.0	Capella	280 24.0	N46 01.2	
	02	338 26.6	190 44.9	24.9	174 03.9	39.9	296 56.3	45.4	0 14.0	00.1	Deneb	49 26.1	N45 21.8	
	03	353 29.1	205 48.3	24.7	189 05.0	39.3	311 58.5	45.5	15 16.6	00.2	Denebola	182 26.4	N14 26.6	
	04	8 31.5	220 51.7	24.4	204 06.0	38.7	327 00.7	45.5	30 19.2	00.2	Diphda	348 48.3	S17 51.3	
	05	23 34.0	235 55.1	24.2	219 07.0	38.1	342 02.9	45.6	45 21.8	00.3				
	06	38 36.5	250 58.5 N 7 23.9	234 08.0 N 7 37.5	357 05.1 N14 45.7	60 24.4 S11 00.3	Dubhe	193 43.0	N61 37.7					
	07	53 38.9	266 01.9	23.6	249 09.1	36.9	12 07.3	45.8	75 27.0	00.4	Einath	278 03.6	N28 37.6	
	08	68 41.4	281 05.4	23.4	264 10.1	36.2	27 09.5	45.8	90 29.6	00.5	Eltanin	90 42.3	N51 29.3	
	09	83 43.8	296 08.8	23.1	279 11.1	35.6	42 11.7	45.9	105 32.2	00.5	Enif	33 39.6	N 9 59.0	
	10	98 46.3	311 12.2	22.9	294 12.1	35.0	57 13.9	46.0	120 34.8	00.6	Fomalhaut	15 15.5	S29 29.7	
	11	113 48.8	326 15.7	22.7	309 13.2	34.4	72 16.1	46.0	135 37.4	00.7				
	12	128 51.2	341 19.1 N 7 22.4	324 14.2 N 7 33.8	87 18.3 N14 46.1	150 40.0 S11 00.7	Gacrux	171 53.3	S57 14.9					
	13	143 53.7	356 22.5	22.2	339 15.2	33.2	102 20.5	46.2	165 42.7	00.8	Gienah	175 45.0	S17 40.3	
	14	158 56.2	11 26.0	21.9	354 16.2	32.5	117 22.7	46.3	180 45.3	00.9	Hadar	148 37.8	S60 29.4	
	15	173 58.6	26 29.4	21.7	9 17.3	31.9	132 24.9	46.3	195 47.9	00.9	Hamal	327 52.5	N23 34.3	
	16	189 01.1	41 32.9	21.4	24 18.3	31.3	147 27.1	46.4	210 50.5	01.0	Kaus Aust.	83 33.7	S34 22.4	
	17	204 03.6	56 36.3	21.2	39 19.3	30.7	162 29.3	46.5	225 53.1	01.0				
	18	219 06.0	71 39.8 N 7 21.0	54 20.3 N 7 30.1	177 31.5 N14 46.6	240 55.7 S11 01.1	Kochab	137 19.6	N74 03.8					
	19	234 08.5	86 43.3	20.7	69 21.4	29.4	192 33.7	46.6	255 58.3	01.2	Markab	13 30.8	N15 19.9	
	20	249 11.0	101 46.7	20.5	84 22.4	28.8	207 35.9	46.7	271 00.9	01.2	Menkar	314 07.4	N 4 11.0	
	21	264 13.4	116 50.2	20.3	99 23.4	28.2	222 38.1	46.8	286 03.5	01.3	Menkent	147 59.1	S36 29.2	
	22	279 15.9	131 53.7	20.0	114 24.4	27.6	237 40.3	46.8	301 06.1	01.4	Miaplacidus	221 39.5	S69 48.8	
	23	294 18.3	146 57.2	19.8	129 25.5	27.0	252 42.5	46.9	316 08.7	01.4				
TUESDAY	1 00	309 20.8	162 00.6 N 7 19.6	144 26.5 N 7 26.4	267 44.7 N14 47.0	331 11.4 S11 01.5	Mirfak	308 30.1	N49 56.5					
	01	324 23.3	177 04.1	19.4	159 27.5	25.7	282 46.9	47.1	346 14.0	01.6	Nunki	75 48.9	S26 16.0	
	02	339 25.7	192 07.6	19.1	174 28.5	25.1	297 49.1	47.1	1 16.6	01.6	Peacock	53 07.0	S56 39.5	
	03	354 28.2	207 11.1	18.9	189 29.6	24.5	312 51.3	47.2	16 19.2	01.7	Pollux	243 19.1	N27 58.2	
	04	9 30.7	222 14.6	18.7	204 30.6	23.9	327 53.5	47.3	31 21.8	01.7	Procyon	244 52.4	N 5 10.0	
	05	24 33.1	237 18.1	18.5	219 31.6	23.3	342 55.7	47.3	46 24.4	01.8				
	06	39 35.6	252 21.6 N 7 18.3	234 32.6 N 7 22.6	357 57.9 N14 47.4	61 27.0 S11 01.9	Rasalhague	95 59.4	N12 32.7					
	07	54 38.1	267 25.1	18.1	249 33.7	22.0	13 00.1	47.5	76 29.6	01.9	Regulus	207 36.0	N11 51.3	
	08	69 40.5	282 28.6	17.8	264 34.7	21.4	28 02.3	47.6	91 32.2	02.0	Rigel	281 05.2	S 8 10.3	
	09	84 43.0	297 32.1	17.6	279 35.7	20.8	43 04.5	47.6	106 34.8	02.1	Rigel Kent.	139 41.9	S60 56.1	
	10	99 45.5	312 35.6	17.4	294 36.7	20.2	58 06.7	47.7	121 37.5	02.1	Sabik	102 03.9	S15 45.2	
	11	114 47.9	327 39.1	17.2	309 37.8	19.6	73 08.9	47.8	136 40.1	02.2				
	12	129 50.4	342 42.7 N 7 17.0	324 38.8 N 7 18.9	88 11.1 N14 47.8	151 42.7 S11 02.3	Schedar	349 32.1	N56 39.8					
	13	144 52.8	357 46.2	16.8	339 39.8	18.3	103 13.3	47.9	166 45.3	02.3	Shaula	96 11.7	S37 07.3	
	14	159 55.3	12 49.7	16.6	354 40.8	17.7	118 15.5	48.0	181 47.9	02.4	Sirius	258 27.6	S16 44.7	
	15	174 57.8	27 53.3	16.4	9 41.9	17.1	133 17.7	48.0	196 50.5	02.5	Spica	158 23.6	S11 17.0	
	16	190 00.2	42 56.8	16.2	24 42.9	16.5	148 19.9	48.1	211 53.1	02.5	Suhail	222 47.6	S43 31.6	
	17	205 02.7	58 00.3	16.0	39 43.9	15.8	163 22.1	48.2	226 55.7	02.6				
	18	220 05.2	73 03.9 N 7 15.8	54 44.9 N 7 15.2	178 24.3 N14 48.3	241 58.3 S11 02.6	Vega	80 33.6	N38 48.4					
	19	235 07.6	88 07.4	15.6	69 46.0	14.6	193 26.5	48.3	257 01.0	02.7	Zuben'ubi	136 57.3	S16 08.4	
	20	250 10.1	103 11.0	15.4	84 47.0	14.0	208 28.7	48.4	272 03.6	02.8				
	21	265 12.6	118 14.5	15.2	99 48.0	13.4	223 30.9	48.5	287 06.2	02.8				
	22	280 15.0	133 18.1	15.0	114 49.0	12.7	238 33.1	48.5	302 08.8	02.9	Venus	212 16.4	h m 13 14	
	23	295 17.5	148 21.6	14.8	129 50.1	12.1	253 35.4	48.6	317 11.4	03.0	Mars	195 40.2	14 23	
Mer. Pass. 3 26.0		v 3.4 d 0.2		v 1.0 d 0.6		v 2.2 d 0.1		v 2.6 d 0.1		Jupiter			318 30.2	6 12
										Saturn			21 47.1	1 59

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	30	31	1	2	
									h		m	h	m	h	m	h
d h	° /	° /	° /	' /	' /	' /	' /	°	h m	h m	h m	h m	h m	h m	h m	
SUNDAY	30 00	178 22.4	N18 37.1	39 55.2	2.7	S27 43.1	2.2	59.8	N 72							23 44
	01	193 22.4	36.5	54 16.9	2.6	27 45.3	2.0	59.8	N 70	////	////	01 14				23 01
	02	208 22.4	35.9	68 38.5	2.6	27 47.3	1.8	59.9	68	////	////	02 08				22 32
	03	223 22.5	35.3	83 00.1	2.5	27 49.1	1.5	59.9	66	////	////	02 40				22 45
	04	238 22.5	34.7	97 21.6	2.4	27 50.6	1.4	59.9	64	////	01 32	03 04		22 58	22 08	21 52
	05	253 22.5	34.1	111 43.0	2.3	27 52.0	1.2	60.0	62	////	02 10	03 22	21 56	21 46	21 41	21 37
	06	268 22.5	N18 33.5	126 04.3	2.3	S27 53.2	1.0	60.0	60	////	02 36	03 38	20 41	21 10	21 20	21 25
	07	283 22.6	32.9	140 25.6	2.2	27 54.2	0.7	60.0	N 58	01 23	02 56	03 50	20 05	20 44	21 03	21 14
	08	298 22.6	32.3	154 46.8	2.2	27 54.9	0.6	60.1	56	01 58	03 12	04 01	19 39	20 23	20 49	21 01
	09	313 22.6	31.7	169 08.0	2.1	27 55.5	0.3	60.1	54	02 22	03 26	04 11	19 18	20 06	20 36	20 56
	10	328 22.6	31.1	183 29.1	2.0	27 55.8	0.2	60.1	52	02 41	03 38	04 20	19 01	19 51	20 25	20 48
	11	343 22.7	30.5	197 50.1	2.0	27 56.0	0.1	60.2	50	02 57	03 48	04 27	18 46	19 38	20 15	20 41
	12	358 22.7	N18 29.9	212 11.1	2.0	S27 55.9	0.2	60.2	45	03 27	04 10	04 44	18 16	19 12	19 54	20 27
	13	13 22.7	29.3	226 32.1	1.9	27 55.7	0.5	60.2	N 40	03 49	04 27	04 57	17 53	18 50	19 37	20 14
	14	28 22.7	28.7	240 53.0	1.9	27 55.2	0.7	60.3	35	04 07	04 40	05 08	17 34	18 33	19 23	20 04
	15	43 22.8	28.1	255 13.9	1.9	27 54.5	0.9	60.3	30	04 21	04 52	05 18	17 17	18 18	19 10	19 55
	16	58 22.8	27.5	269 34.8	1.8	27 53.6	1.1	60.3	20	04 44	05 11	05 35	16 49	17 52	18 48	19 39
	17	73 22.8	26.9	283 55.6	1.8	27 52.5	1.3	60.4	N 10	05 01	05 27	05 49	16 25	17 29	18 30	19 25
	18	88 22.9	N18 26.3	298 16.4	1.7	S27 51.2	1.5	60.4	0	05 16	05 41	06 03	16 03	17 08	18 12	19 12
	19	103 22.9	25.7	312 37.1	1.7	27 49.7	1.7	60.4	S 10	05 29	05 54	06 16	15 40	16 47	17 54	18 58
	20	118 22.9	25.1	326 57.8	1.8	27 48.0	2.0	60.5	20	05 41	06 07	06 30	15 16	16 25	17 35	18 44
	21	133 22.9	24.5	341 18.6	1.7	27 46.0	2.1	60.5	30	05 52	06 21	06 46	14 48	15 58	17 13	18 28
	22	148 23.0	23.9	355 39.3	1.6	27 43.9	2.4	60.5	35	05 58	06 29	06 56	14 32	15 43	17 00	18 18
23	163 23.0	23.2	9 59.9	1.7	27 41.5	2.6	60.5	40	06 05	06 37	07 06	14 12	15 25	16 45	18 07	
								45	06 11	06 47	07 18	13 49	15 03	16 27	17 54	
MONDAY	31 00	178 23.0	N18 22.6	24 20.6	1.7	S27 38.9	2.7	60.6	S 50	06 19	06 58	07 33	13 19	14 36	16 05	17 39
	01	193 23.1	22.0	38 41.3	1.6	27 36.2	3.0	60.6	52	06 22	07 03	07 40	13 05	14 22	15 54	17 31
	02	208 23.1	21.4	53 01.9	1.7	27 33.2	3.3	60.6	54	06 25	07 09	07 48	12 48	14 06	15 42	17 23
	03	223 23.1	20.8	67 22.6	1.7	27 29.9	3.4	60.6	56	06 29	07 15	07 57	12 27	13 48	15 28	17 14
	04	238 23.2	20.2	81 43.3	1.7	27 26.5	3.6	60.7	58	06 33	07 21	08 06	12 02	13 25	15 12	17 03
	05	253 23.2	19.6	96 04.0	1.6	27 22.9	3.9	60.7	S 60	06 38	07 29	08 18	11 27	12 56	14 52	16 50
	06	268 23.2	N18 19.0	110 24.6	1.7	S27 19.0	4.0	60.7								
	07	283 23.2	18.3	124 45.3	1.7	27 15.0	4.3	60.8	Lat.	Sunset						
	08	298 23.3	17.7	139 06.0	1.8	27 10.7	4.5	60.8			Civil	Naut.	30	31	1	2
	09	313 23.3	17.1	153 26.8	1.7	27 06.2	4.7	60.8								
	10	328 23.3	16.5	167 47.5	1.8	27 01.5	4.9	60.8								
	11	343 23.4	15.9	182 08.3	1.8	26 56.6	5.1	60.9								
	12	358 23.4	N18 15.3	196 29.1	1.8	S26 51.5	5.3	60.9	N 72							
	13	13 23.4	14.7	210 49.9	1.9	26 46.2	5.5	60.9	N 70	22 50	////	////				
	14	28 23.5	14.0	225 10.8	1.9	26 40.7	5.7	60.9	68	22 00	////	////				01 17
	15	43 23.5	13.4	239 31.7	2.0	26 35.0	6.0	60.9	66	21 29	////	////				02 26
	16	58 23.5	12.8	253 52.7	1.9	26 29.0	6.1	61.0	64	21 07	22 36	////		23 59	27 02	03 02
	17	73 23.6	12.2	268 13.6	2.1	26 22.9	6.3	61.0	62	20 48	22 00	////	22 43	25 11	01 11	03 27
	18	88 23.6	N18 11.6	282 34.7	2.1	S26 16.6	6.6	61.0	60	20 34	21 34	////	23 58	25 47	01 47	03 47
	19	103 23.6	10.9	296 55.8	2.1	26 10.0	6.7	61.0	N 58	20 21	21 15	22 45	24 34	00 34	02 12	04 04
	20	118 23.7	10.3	311 16.9	2.2	26 03.3	7.0	61.0	56	20 10	20 59	22 12	25 00	01 00	02 32	04 17
	21	133 23.7	9.7	325 38.1	2.2	25 56.3	7.1	61.1	54	20 01	20 45	21 48	00 14	01 20	02 49	04 29
	22	148 23.8	09.1	339 59.3	2.3	25 49.2	7.4	61.1	52	19 52	20 34	21 30	00 31	01 37	03 04	04 40
23	163 23.8	08.5	354 20.6	2.4	25 41.8	7.5	61.1	50	19 45	20 23	21 14	00 46	01 52	03 16	04 49	
								45	19 28	20 02	20 45	01 15	02 22	03 42	05 08	
TUESDAY	1 00	178 23.8	N18 07.8	8 42.0	2.4	S25 34.3	7.7	61.1	N 40	19 15	19 46	20 23	01 39	02 45	04 02	05 24
	01	193 23.9	07.2	23 03.4	2.5	25 26.6	8.0	61.1	35	19 04	19 32	20 06	01 58	03 04	04 19	05 37
	02	208 23.9	06.6	37 24.9	2.6	25 18.6	8.1	61.1	30	18 54	19 20	19 51	02 14	03 21	04 34	05 49
	03	223 23.9	06.0	51 46.5	2.6	25 10.5	8.3	61.2	20	18 38	19 01	19 29	02 42	03 48	04 58	06 08
	04	238 24.0	05.3	66 08.1	2.7	25 02.2	8.5	61.2	N 10	18 23	18 45	19 11	03 06	04 12	05 19	06 25
	05	253 24.0	04.7	80 29.8	2.8	24 53.7	8.7	61.2	0	18 10	18 32	18 57	03 29	04 34	05 39	06 41
	06	268 24.0	N18 04.1	94 51.6	2.8	S24 45.0	8.9	61.2	S 10	17 57	18 19	18 44	03 51	04 56	05 58	06 56
	07	283 24.1	03.5	109 13.4	3.0	24 36.1	9.1	61.2	20	17 43	18 06	18 32	04 15	05 19	06 19	07 13
	08	298 24.1	02.8	123 35.4	3.0	24 27.0	9.2	61.2	30	17 27	17 52	18 21	04 43	05 46	06 43	07 31
	09	313 24.2	02.2	137 57.4	3.1	24 17.8	9.5	61.2	35	17 18	17 44	18 15	04 59	06 02	06 57	07 42
	10	328 24.2	01.6	152 19.5	3.2	24 08.3	9.6	61.3	40	17 07	17 36	18 09	05 18	06 21	07 13	07 55
	11	343 24.2	00.9	166 41.7	3.3	23 58.7	9.8	61.3	45	16 55	17 27	18 02	05 42	06 43	07 32	08 09
	12	358 24.3	N18 00.3	181 04.0	3.3	S23 48.9	10.0	61.3	S 50	16 40	17 15	17 55	06 11	07 11	07 55	08 27
	13	13 24.3	17 59.7	195 26.3	3.5	23 38.9	10.1	61.3	52	16 33	17 10	17 51	06 26	07 25	08 07	08 35
	14	28 24.4	59.1	209 48.8	3.5	23 28.8	10.3	61.3	54	16 25	17 05	17 48	06 43	07 41	08 19	08 44
	15	43 24.4	58.4	224 11.3	3.6	23 18.5	10.5	61.3	56	16 17	16 59	17 44	07 03	08 00	08 34	08 54
	16	58 24.4	57.8	238 33.9	3.8	23 08.0	10.7	61.3	58	16 07	16 52	17 40	07 29	08 23	08 51	09 06
	17	73 24.5	57.2	252 56.7	3.8	22 57.3	10.8	61.3	S 60	15 56	16 45	17 36	08 04	08 53	09 12	09 19
	18	88 24.5	N17 56.5	267 19.5	3.9	S22 46.5	11.0	61.3								
	19	103 24.6	55.9	281 42.4	4.0	22 35.5	11.2	61.3								
	20	118 24.6	55.3	296 05.4	4.1	22 24.3	11.3	61.3	Day	Eqn. of Time	Mer.		Mer. Pass.		Age	Phase
	21	133 24.6	54.6	310 28.5	4.3	22 13.0	11.5	61.3		00 ^h	12 ^h	Pass.	Upper	Lower	d	%
	22	148 24.7	54.0	324 51.8	4.3	22 01.5	11.6	61.4	d	m s	m s	h m	h m	h m	d	%
23	163 24.7	53.4	339 15.1	4.4	S21 49.9	11.8	61.4	30	06 30	06 29	12 06	22 18	09 45	13 92		
								31	06 28	06 26	12 06	23 24	10 51	14 97		
	SD 15.8	d 0.6	SD	16.4	16.6	16.7		1	06 25	06 23	12 06	24 27	11 56	15 100		

UT	ARIES		VENUS -4.2		MARS +1.8		JUPITER -2.4		SATURN +0.5		STARS		
	GHA		GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
WEDNESDAY	2001	310 20.0	163 25.2	N 7 14.6	144 51.1	N 7 11.5	268 37.6	N14 48.7	332 14.0	S11 03.0	Acamar	315 12.7	S40 12.3
	01	325 22.4	178 28.8		145	10.9	283 39.8	48.7	347 16.6	03.1	Achernar	335 20.9	S57 06.7
	02	340 24.9	193 32.3	14.3	174 53.1	10.3	298 42.0	48.8	2 19.2	03.2	Acruz	173 01.8	S63 14.0
	03	355 27.3	208 35.9	14.1	189 54.2	09.6	313 44.2	48.9	17 21.8	03.2	Adhara	255 07.1	S29 00.1
	04	10 29.8	223 39.5	13.9	204 55.2	09.0	328 46.4	48.9	32 24.5	03.3	Aldebaran	290 41.1	N16 33.4
	05	25 32.3	238 43.1	13.7	219 56.2	08.4	343 48.6	49.0	47 27.1	03.4			
	06	40 34.7	253 46.6	N 7 13.5	234 57.2	N 7 07.8	358 50.8	N14 49.1	62 29.7	S11 03.4	Alioth	166 14.2	N55 50.2
	07	55 37.2	268 50.2	13.4	249 58.2	07.2	13 53.0	49.2	77 32.3	03.5	Alkaid	152 53.0	N49 12.0
	08	70 39.7	283 53.8	13.2	264 59.3	06.5	28 55.2	49.2	92 34.9	03.5	Alnair	27 33.9	S46 50.3
	09	85 42.1	298 57.4	13.0	280 00.3	05.9	43 57.4	49.3	107 37.5	03.6	Anilam	275 39.2	S 1 11.1
THURSDAY	10	100 44.6	314 01.0	12.9	295 01.3	05.3	58 59.7	49.4	122 40.1	03.7	Alphard	217 49.2	S 8 45.5
	11	115 47.1	329 04.6	12.7	310 02.3	04.7	74 01.9	49.4	137 42.7	03.7			
	12	130 49.5	344 08.2	N 7 12.5	325 03.4	N 7 04.0	89 04.1	N14 49.5	152 45.4	S11 03.8	Alphecca	126 04.6	N26 38.3
	13	145 52.0	359 11.8	12.3	340 04.4	03.4	104 06.3	49.6	167 48.0	03.9	Alpheratz	357 35.8	N29 13.1
	14	160 54.4	14 15.4	12.2	355 05.4	02.8	119 08.5	49.6	182 50.6	03.9	Altair	62 00.8	N 8 55.9
	15	175 56.9	29 19.0	12.0	10 06.4	02.2	134 10.7	49.7	197 53.2	04.0	Ankaa	353 08.1	S42 10.5
	16	190 59.4	44 22.6	11.9	25 07.5	01.6	149 12.9	49.8	212 55.8	04.1	Antares	112 17.1	S26 29.1
	17	206 01.8	59 26.3	11.7	40 08.5	00.9	164 15.1	49.8	227 58.4	04.1			
	18	221 04.3	74 29.9	N 7 11.5	55 09.5	N 7 00.3	179 17.3	N14 49.9	243 01.0	S11 04.2	Arcturus	145 49.0	N19 03.8
	19	236 06.8	89 33.5	11.4	70 10.5	6 59.7	194 19.6	50.0	258 03.7	04.3	Atria	107 12.1	S69 04.4
FRIDAY	20	251 09.2	104 37.1	11.2	85 11.6	59.1	209 21.8	50.0	273 06.3	04.3	Avior	234 15.9	S59 35.0
	21	266 11.7	119 40.8	11.1	100 12.6	58.5	224 24.0	50.1	288 08.9	04.4	Bellatrix	278 24.4	N 6 22.3
	22	281 14.2	134 44.4	10.9	115 13.6	57.8	239 26.2	50.2	303 11.5	04.5	Betelgeuse	270 53.6	N 7 24.8
	23	296 16.6	149 48.0	10.8	130 14.6	57.2	254 28.4	50.2	318 14.1	04.5			
	3001	311 19.1	164 51.7	N 7 10.6	145 15.7	N 6 56.6	269 30.6	N14 50.3	333 16.7	S11 04.6	Canopus	263 53.4	S52 42.2
	01	326 21.6	179 55.3	10.5	160 16.7	56.0	284 32.8	50.4	348 19.3	04.7	Capella	280 23.9	N46 01.2
	02	341 24.0	194 59.0	10.3	175 17.7	55.3	299 35.0	50.4	3 22.0	04.7	Deneb	49 26.1	N45 21.9
	03	356 26.5	210 02.6	10.2	190 18.7	54.7	314 37.3	50.5	18 24.6	04.8	Denebola	182 26.4	N14 26.6
	04	11 28.9	225 06.3	10.0	205 19.8	54.1	329 39.5	50.6	33 27.2	04.8	Diphda	348 48.3	S17 51.3
	05	26 31.4	240 09.9	09.9	220 20.8	53.5	344 41.7	50.6	48 29.8	04.9			
SATURDAY	06	41 33.9	255 13.6	N 7 09.8	235 21.8	N 6 52.8	359 43.9	N14 50.7	63 32.4	S11 05.0	Dubhe	193 43.0	N61 37.7
	07	56 36.3	270 17.2	09.6	250 22.8	52.2	14 46.1	50.8	78 35.0	05.0	Elnath	278 03.6	N28 37.6
	08	71 38.8	285 20.9	09.5	265 23.9	51.6	29 48.3	50.8	93 37.6	05.1	Eltanin	90 42.3	N51 29.3
	09	86 41.3	300 24.6	09.3	280 24.9	51.0	44 50.6	50.9	108 40.3	05.2	Enif	33 39.6	N 9 59.0
	10	101 43.7	315 28.2	09.2	295 25.9	50.4	59 52.8	51.0	123 42.9	05.2	Fomalhaut	15 15.5	S29 29.7
	11	116 46.2	330 31.9	09.1	310 26.9	49.7	74 55.0	51.0	138 45.5	05.3			
	12	131 48.7	345 35.6	N 7 08.9	325 28.0	N 6 49.1	89 57.2	N14 51.1	153 48.1	S11 05.4	Gacrux	171 53.3	S57 14.9
	13	146 51.1	0 39.3	08.8	340 29.0	48.5	104 59.4	51.2	168 50.7	05.4	Gienah	175 45.0	S17 40.3
	14	161 53.6	15 42.9	08.7	355 30.0	47.9	120 01.6	51.2	183 53.3	05.5	Hadar	148 37.8	S60 29.4
	15	176 56.1	30 46.6	08.6	10 31.0	47.2	135 03.9	51.3	198 55.9	05.6	Hamal	327 52.5	N23 34.4
SUNDAY	16	191 58.5	45 50.3	08.4	25 32.1	46.6	150 06.1	51.4	213 58.6	05.6	Kaus Aust.	83 33.7	S34 22.4
	17	207 01.0	60 54.0	08.3	40 33.1	46.0	165 08.3	51.4	229 01.2	05.7			
	18	222 03.4	75 57.7	N 7 08.2	55 34.1	N 6 45.4	180 10.5	N14 51.5	244 03.8	S11 05.8	Kochab	137 19.7	N74 03.8
	19	237 05.9	91 01.4	08.1	70 35.1	44.7	195 12.7	51.6	259 06.4	05.8	Markab	13 30.8	N15 19.9
	20	252 08.4	106 05.1	08.0	85 36.2	44.1	210 15.0	51.6	274 09.0	05.9	Menkar	314 07.4	N 4 11.0
	21	267 10.8	121 08.8	07.8	100 37.2	43.5	225 17.2	51.7	289 11.6	06.0	Menkent	147 59.1	S36 29.2
	22	282 13.3	136 12.5	07.7	115 38.2	42.9	240 19.4	51.8	304 14.3	06.0	Miaplacidus	221 39.5	S69 48.8
	23	297 15.8	151 16.2	07.6	130 39.2	42.2	255 21.6	51.8	319 16.9	06.1			
	4001	312 18.2	166 19.9	N 7 07.5	145 40.3	N 6 41.6	270 23.8	N14 51.9	334 19.5	S11 06.2	Mirfak	308 30.1	N49 56.6
	01	327 20.7	181 23.6	07.4	160 41.3	41.0	285 26.1	52.0	349 22.1	06.2	Nunki	75 48.9	S26 16.6
02	342 23.2	196 27.4	07.3	175 42.3	40.4	300 28.3	52.0	4 24.7	06.3	Peacock	53 07.0	S56 39.5	
03	357 25.6	211 31.1	07.2	190 43.3	39.7	315 30.5	52.1	19 27.3	06.4	Pollux	243 19.1	N27 58.2	
04	12 28.1	226 34.8	07.1	205 44.4	39.1	330 32.7	52.2	34 30.0	06.4	Procyon	244 52.4	N 5 10.0	
05	27 30.5	241 38.5	07.0	220 45.4	38.5	345 34.9	52.2	49 32.6	06.5				
MONDAY	06	42 33.0	256 42.3	N 7 06.9	235 46.4	N 6 37.9	0 37.2	N14 52.3	64 35.2	S11 06.6	Rasalhague	95 59.4	N12 32.7
	07	57 35.5	271 46.0	06.8	250 47.4	37.2	15 39.4	52.3	79 37.8	06.6	Regulus	207 36.0	N11 51.3
	08	72 37.9	286 49.7	06.7	265 48.5	36.6	30 41.6	52.4	94 40.4	06.7	Rigel	281 05.2	S 8 10.3
	09	87 40.4	301 53.5	06.6	280 49.5	36.0	45 43.8	52.5	109 43.0	06.8	Rigel Kent.	139 41.9	S60 56.1
	10	102 42.9	316 57.2	06.5	295 50.5	35.4	60 46.1	52.5	124 45.7	06.8	Sabik	102 03.9	S15 45.2
	11	117 45.3	332 00.9	06.4	310 51.5	34.7	75 48.3	52.6	139 48.3	06.9			
	12	132 47.8	347 04.7	N 7 06.3	325 52.6	N 6 34.1	90 50.5	N14 52.7	154 50.9	S11 07.0	Schedar	349 32.1	N56 39.8
	13	147 50.3	2 08.4	06.2	340 53.6	33.5	105 52.7	52.7	169 53.5	07.0	Shaula	96 11.7	S37 07.3
	14	162 52.7	17 12.2	06.1	355 54.6	32.9	120 54.9	52.8	184 56.1	07.1	Sirius	258 27.6	S16 44.7
	15	177 55.2	32 15.9	06.0	10 55.6	32.2	135 57.2	52.9	199 58.7	07.2	Spica	158 23.5	N11 17.0
TUESDAY	16	192 57.7	47 19.7	06.0	25 56.7	31.6	150 59.4	52.9	215 01.4	07.2	Suhail	222 47.6	S43 31.6
	17	208 00.1	62 23.5	05.9	40 57.7	31.0	166 01.6	53.0	230 04.0	07.3			
	18	223 02.6	77 27.2	N 7 05.8	55 58.7	N 6 30.4	181 03.8	N14 53.1	245 06.6	S11 07.4	Vega	80 33.7	N38 48.4
	19	238 05.0	92 31.0	05.7	70 59.7	29.7	196 06.1	53.1	260 09.2	07.4	Zuben'ubi	136 57.3	S16 08.4
	20	253 07.5	107 34.8	05.6	86 00.8	29.1	211 08.3	53.2	275 11.8	07.5			
	21	268 10.0	122 38.5	05.5	101 01.8	28.5	226 10.5	53.2	290 14.4	07.6			
	22	283 12.4	137 42.3	05.5	116 02.8	27.9	241 12.8	53.3	305 17.1	07.6	Venus	213 32.6	12 57
	23	298 14.9	152 46.1	05.4	131 03.8	27.2	256 15.0	53.4	320 19.7	07.7	Mars	193 56.6	14 18
											Jupiter	318 11.5	6 01
											Saturn	21 57.6	1 47
Mer.Pass. 3 14.2 v 3.7 d 0.1 v 1.0 d 0.6 v 2.2 d 0.1 v 2.6 d 0.1													

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise							
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	2		3	4	5					
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m				
WEDNESDAY	200	178 24.8	N17 52.7	353 38.5	4.5	S21 38.1	11.9	61.4	N 72				23 44	22 30	21 48	21 12				
	01	193 24.8	52.1	8 02.0	4.7	21 26.2	12.1	61.4	N 70	////	////	01 41	23 01	22 14	21 43	21 15				
	02	208 24.9	51.5	22 25.7	4.7	21 14.1	12.3	61.4	68	////	////	02 24	22 32	22 01	21 38	21 18				
	03	223 24.9	50.8	36 49.4	4.8	21 01.8	12.4	61.4	66	////	00 49	02 52	22 10	21 50	21 35	21 21				
	04	238 24.9	50.2	51 13.2	5.0	20 49.4	12.5	61.4	64	////	01 49	03 13	21 52	21 41	21 32	21 23				
	05	253 25.0	49.5	65 37.2	5.0	20 36.9	12.7	61.4	62	////	02 22	03 30	21 37	21 33	21 29	21 25				
	06	268 25.0	N17 48.9	80 01.2	5.2	S20 24.2	12.8	61.4	60	00 44	02 45	03 45	21 25	21 26	21 26	21 26				
	07	283 25.1	48.3	94 25.4	5.2	20 11.4	13.0	61.4	N 58	01 39	03 04	03 57	21 14	21 20	21 24	21 28				
	08	298 25.1	47.6	108 49.6	5.4	19 58.4	13.0	61.4	56	02 09	03 19	04 07	21 04	21 15	21 22	21 29				
	09	313 25.2	47.0	123 14.0	5.5	19 45.4	13.3	61.4	54	02 31	03 32	04 16	20 56	21 10	21 21	21 31				
	10	328 25.2	46.4	137 38.5	5.6	19 32.1	13.3	61.4	52	02 48	03 43	04 24	20 48	21 05	21 19	21 32				
	11	343 25.3	45.7	152 03.1	5.7	19 18.8	13.5	61.4	50	03 03	03 53	04 32	20 41	21 01	21 18	21 33				
	12	358 25.3	N17 45.1	166 27.8	5.8	S19 05.3	13.6	61.4	45	03 31	04 14	04 47	20 27	20 52	21 15	21 35				
	13	13 25.3	44.4	180 52.6	5.9	18 51.7	13.8	61.4	N 40	03 53	04 30	05 00	20 14	20 45	21 12	21 37				
	14	28 25.4	43.8	195 17.5	6.0	18 37.9	13.8	61.3	35	04 09	04 43	05 11	20 04	20 39	21 10	21 38				
	15	43 25.4	43.1	209 42.5	6.1	18 24.1	14.0	61.3	30	04 23	04 54	05 20	19 55	20 33	21 08	21 40				
	16	58 25.5	42.5	224 07.6	6.2	18 10.1	14.1	61.3	20	04 45	05 13	05 36	19 39	20 23	21 04	21 42				
	17	73 25.5	41.9	238 32.8	6.4	17 56.0	14.2	61.3	N 10	05 02	05 28	05 50	19 25	20 15	21 01	21 45				
	18	88 25.6	N17 41.2	252 58.2	6.4	S17 41.8	14.3	61.3	0	05 16	05 41	06 03	19 12	20 07	20 58	21 47				
	19	103 25.6	40.6	267 23.6	6.6	17 27.5	14.4	61.3	S 10	05 28	05 54	06 15	18 58	19 59	20 55	21 49				
	20	118 25.7	39.9	281 49.2	6.7	17 13.1	14.6	61.3	20	05 39	06 06	06 29	18 44	19 50	20 52	21 52				
	21	133 25.7	39.3	296 14.9	6.7	16 58.5	14.6	61.3	30	05 50	06 19	06 44	18 28	19 40	20 48	21 54				
	22	148 25.8	38.6	310 40.6	6.9	16 43.9	14.8	61.3	35	05 56	06 26	06 53	18 18	19 34	20 46	21 56				
	23	163 25.8	38.0	325 06.5	7.0	16 29.1	14.8	61.3	40	06 02	06 34	07 03	18 07	19 27	20 44	21 58				
	THURSDAY	300	178 25.9	N17 37.3	339 32.5	7.1	S16 14.3	15.0	61.3	45	06 08	06 43	07 15	17 54	19 20	20 41	22 00			
01		193 25.9	36.7	353 58.6	7.2	15 59.3	15.0	61.3	S 50	06 15	06 54	07 29	17 39	19 10	20 38	22 03				
02		208 26.0	36.0	8 24.8	7.3	15 44.3	15.2	61.3	52	06 18	06 59	07 36	17 31	19 06	20 37	22 04				
03		223 26.0	35.4	22 51.1	7.4	15 29.1	15.2	61.2	54	06 21	07 04	07 43	17 23	19 01	20 35	22 05				
04		238 26.1	34.7	37 17.5	7.5	15 13.9	15.3	61.2	56	06 24	07 10	07 51	17 14	18 56	20 33	22 07				
05		253 26.1	34.1	51 44.0	7.6	14 58.6	15.4	61.2	58	06 28	07 16	08 00	17 03	18 50	20 31	22 08				
06		268 26.2	N17 33.4	66 10.6	7.7	S14 43.2	15.5	61.2	S 60	06 32	07 23	08 11	16 50	18 43	20 29	22 10				
07		283 26.2	32.8	80 37.3	7.8	14 27.7	15.6	61.2	Lat.		Twilight		Moonset							
08		298 26.3	32.1	95 04.1	8.0	14 12.1	15.6	61.2	Sunset		Civil		Naut.		2	3	4	5		
09		313 26.3	31.5	109 31.1	8.0	13 56.5	15.7	61.2	h m		h m		h m		h m		h m		h m	
10		328 26.4	30.8	123 58.1	8.1	13 40.8	15.8	61.1												
11		343 26.4	30.2	138 25.2	8.2	13 25.0	15.9	61.1	N 72					03 35	06 43	09 14				
12		358 26.5	N17 29.5	152 52.4	8.3	S13 09.1	16.0	61.1	N 70	22 25	////	////		04 16	06 56	09 15				
13		13 26.5	28.9	167 19.7	8.4	12 53.1	16.0	61.1	68	21 45	////	////	01 17	04 43	07 07	09 15				
14		28 26.6	28.2	181 47.1	8.5	12 37.1	16.1	61.1	66	21 17	23 12	////	02 26	05 03	07 15	09 16				
15		43 26.6	27.6	196 14.6	8.6	12 21.0	16.1	61.1	64	20 57	22 18	////	03 02	05 20	07 22	09 16				
16		58 26.7	26.9	210 42.2	8.7	12 04.9	16.2	61.0	62	20 40	21 47	////	03 27	05 33	07 29	09 17				
17		73 26.7	26.3	225 09.9	8.8	11 48.7	16.3	61.0	60	20 26	21 25	23 17	03 47	05 44	07 34	09 17				
18		88 26.8	N17 25.6	239 37.7	8.9	S11 32.4	16.3	61.0	N 58	20 14	21 06	22 29	04 04	05 54	07 39	09 18				
19		103 26.8	25.0	254 05.6	8.9	11 16.1	16.4	61.0	56	20 04	20 52	22 01	04 17	06 02	07 43	09 18				
20		118 26.9	24.3	268 33.5	9.1	10 59.7	16.4	61.0	54	19 55	20 39	21 39	04 29	06 10	07 46	09 18				
21		133 27.0	23.6	283 01.6	9.1	10 43.3	16.5	60.9	52	19 47	20 28	21 22	04 40	06 16	07 50	09 18				
22		148 27.0	23.0	297 29.7	9.2	10 26.8	16.5	60.9	50	19 40	20 18	21 08	04 49	06 22	07 53	09 19				
23		163 27.1	22.3	311 57.9	9.3	10 10.3	16.6	60.9	45	19 25	19 58	20 40	05 08	06 35	07 59	09 19				
FRIDAY		400	178 27.1	N17 21.7	326 26.2	9.4	S 9 53.7	16.6	60.9	N 40	19 12	19 42	20 19	05 24	06 46	08 04	09 20			
	01	193 27.2	21.0	340 54.6	9.5	9 37.1	16.7	60.9	35	19 01	19 29	20 02	05 37	06 55	08 09	09 20				
	02	208 27.2	20.3	355 23.1	9.6	9 20.4	16.7	60.8	30	18 52	19 18	19 49	05 49	07 03	08 13	09 20				
	03	223 27.3	19.7	9 51.7	9.6	9 03.7	16.8	60.8	20	18 36	19 00	19 27	06 08	07 16	08 20	09 21				
	04	238 27.3	19.0	24 20.3	9.8	8 46.9	16.7	60.8	N 10	18 22	18 45	19 10	06 25	07 27	08 26	09 21				
	05	253 27.4	18.4	38 49.1	9.8	8 30.2	16.9	60.8	0	18 10	18 31	18 57	06 41	07 38	08 31	09 21				
	06	268 27.5	N17 17.7	53 17.9	9.8	S 8 13.3	16.8	60.7	S 10	17 57	18 19	18 44	06 56	07 49	08 37	09 22				
	07	283 27.5	17.0	67 46.7	10.0	7 56.5	16.9	60.7	20	17 44	18 07	18 33	07 13	08 00	08 43	09 22				
	08	298 27.6	16.4	82 15.7	10.0	7 39.6	16.9	60.7	30	17 29	17 54	18 22	07 31	08 13	08 49	09 22				
	09	313 27.6	15.7	96 44.7	10.1	7 22.7	16.9	60.7	35	17 20	17 46	18 17	07 42	08 20	08 53	09 23				
	10	328 27.7	15.0	111 13.8	10.2	7 05.8	17.0	60.6	40	17 10	17 39	18 11	07 55	08 28	08 57	09 23				
	11	343 27.7	14.4	125 43.0	10.3	6 48.8	16.9	60.6	45	16 58	17 30	18 05	08 09	08 38	09 02	09 23				
	12	358 27.8	N17 13.7	140 12.3	10.3	S 6 31.9	17.0	60.6	S 50	16 44	17 19	17 58	08 27	08 49	09 08	09 23				
	13	13 27.9	13.1	154 41.6	10.4	6 14.9	17.1	60.6	52	16 38	17 14	17 55	08 35	08 55	09 10	09 23				
	14	28 27.9	12.4	169 11.0	10.4	5 57.8	17.0	60.5	54	16 30	17 09	17 52	08 44	09 01	09 13	09 23				
	15	43 28.0	11.7	183 40.4	10.5	5 40.8	17.0	60.5	56	16 22	17 04	17 49	08 54	09 07	09 16	09 24				
	16	58 28.0	11.1	198 09.9	10.6	5 23.8	17.1	60.5	58	16 13	16 57	17 45	09 06	09 14	09 20	09 24				
	17	73 28.1	10.4	212 39.5	10.7	5 06.7	17.1	60.4	S 60	16 03	16 50	17 41	09 19	09 22	09 23	09 24				
	18	88 28.2	N17 09.7	227 09.2	10.7	S 4 49.6	17.0	60.4	Day		SUN		MOON							
	19	103 28.2	09.1	241 38.9	10.7	4 32.6	17.1	60.4	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase					
	20	118 28.3	08.4	256 08.6	10.9	4 15.5	17.1	60.4	00 ^h 12 ^h			Pass.	Upper				Lower			
	21	133 28.3	7.7	270 38.5	10.9	3 58.4	17.1	60.3	d	m s	m s	h m	h m	h m	d	%				
	22	148 28.4	07.0	285 08.4	10.9	3 41.3	17.1	60.3												

UT	ARIES		VENUS -4.0		MARS +1.8		JUPITER -2.4		SATURN +0.5		STARS					
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec		
SATURDAY	d h	d h	d h	d h	d h	d h	d h	d h	d h	d h	d h					
	5 00	313 17.4	167 49.9 N 7 05.3	146 04.8 N 6 26.6	271 17.2 N14 53.4	335 22.3 S11 07.8	Acamar	315 12.7 S40 12.3								
	01	328 19.8	182 53.6 05.3	161 05.9 26.0	286 19.4 53.5	350 24.9 07.8	Achernar	335 20.9 S57 06.7								
	02	343 22.3	197 57.4 05.2	176 06.9 25.4	301 21.7 53.6	5 27.5 07.9	Acrux	173 01.8 S63 14.0								
	03	358 24.8	213 01.2 . 05.1	191 07.9 . 24.7	316 23.9 . 53.6	20 30.2 . 08.0	Adhara	255 07.1 S29 00.0								
	04	13 27.2	228 05.0 05.1	206 08.9 24.1	331 26.1 53.7	35 32.8 08.0	Aldebaran	290 41.1 N16 33.4								
	05	28 29.7	243 08.8 05.0	221 10.0 23.5	346 28.3 53.7	50 35.4 08.1										
	06	43 32.1	258 12.6 N 7 04.9	236 11.0 N 6 22.8	1 30.6 N14 53.8	65 38.0 S11 08.2	Alioth	166 14.3 N55 50.2								
	07	58 34.6	273 16.4 04.9	251 12.0 22.2	16 32.8 53.9	80 40.6 08.2	Alkaid	152 53.0 N49 12.0								
	08	73 37.1	288 20.2 04.8	266 13.0 21.6	31 35.0 53.9	95 43.3 08.3	Alnair	27 33.9 S46 50.7								
	09	88 39.5	303 24.0 . 04.8	281 14.1 . 21.0	46 37.3 . 54.0	110 45.9 . 08.4	Alnilam	275 39.1 S 1 11.1								
	10	103 42.0	318 27.8 04.7	296 15.1 20.3	61 39.5 54.1	125 48.5 08.4	Alphard	217 49.2 S 8 45.5								
	11	118 44.5	333 31.6 04.6	311 16.1 19.7	76 41.7 54.1	140 51.1 08.5										
	12	133 46.9	348 35.4 N 7 04.6	326 17.1 N 6 19.1	91 44.0 N14 54.2	155 53.7 S11 08.6	Alphecca	126 04.7 N26 38.3								
	13	148 49.4	3 39.2 04.5	341 18.2 18.5	106 46.2 54.2	170 56.3 08.6	Alpheratz	357 35.8 N29 13.2								
	14	163 51.9	18 43.0 04.5	356 19.2 17.8	121 48.4 54.3	185 59.0 08.7	Altair	62 00.8 N 8 55.9								
	15	178 54.3	33 46.8 . 04.4	11 20.2 . 17.2	136 50.6 . 54.4	201 01.6 . 08.8	Ankaa	353 08.0 S42 10.5								
	16	193 56.8	48 50.6 04.4	26 21.2 16.6	151 52.9 54.4	216 04.2 08.8	Antares	112 17.1 S26 29.1								
	17	208 59.3	63 54.5 04.3	41 22.3 15.9	166 55.1 54.5	231 06.8 08.9										
	18	224 01.7	78 58.3 N 7 04.3	56 23.3 N 6 15.3	181 57.3 N14 54.5	246 09.4 S11 09.0	Arcturus	145 49.0 N19 03.8								
	19	239 04.2	94 02.1 04.3	71 24.3 14.7	196 59.6 54.6	261 12.1 09.0	Atria	107 12.1 S69 04.4								
	20	254 06.6	109 05.9 04.2	86 25.3 14.1	212 01.8 54.7	276 14.7 09.1	Avior	234 15.9 S59 34.9								
	21	269 09.1	124 09.8 . 04.2	101 26.4 . 13.4	227 04.0 . 54.7	291 17.3 . 09.2	Bellatrix	278 24.4 N 6 22.3								
	22	284 11.6	139 13.6 04.1	116 27.4 12.8	242 06.3 54.8	306 19.9 09.2	Betelgeuse	270 53.6 N 7 24.8								
	23	299 14.0	154 17.4 04.1	131 28.4 12.2	257 08.5 54.9	321 22.5 09.3										
SUNDAY	6 00	314 16.5	169 21.3 N 7 04.1	146 29.4 N 6 11.5	272 10.7 N14 54.9	336 25.2 S11 09.4	Canopus	263 53.4 S52 42.2								
	01	329 19.0	184 25.1 04.0	161 30.5 10.9	287 13.0 55.0	351 27.8 09.4	Capella	280 23.9 N46 01.2								
	02	344 21.4	199 29.0 04.0	176 31.5 10.3	302 15.2 55.0	6 30.4 09.5	Deneb	49 26.1 N45 21.9								
	03	359 23.9	214 32.8 . 04.0	191 32.5 . 09.7	317 17.4 . 55.1	21 33.0 . 09.6	Denebola	182 26.4 N14 26.6								
	04	14 26.4	229 36.6 04.0	206 33.5 09.0	332 19.7 55.2	36 35.6 09.6	Diphda	348 48.3 S17 51.3								
	05	29 28.8	244 40.5 03.9	221 34.6 08.4	347 21.9 55.2	51 38.3 09.7										
	06	44 31.3	259 44.3 N 7 03.9	236 35.6 N 6 07.8	2 24.1 N14 55.3	66 40.9 S11 09.8	Dubhe	193 43.0 N61 37.7								
	07	59 33.8	274 48.2 03.9	251 36.6 07.1	17 26.4 55.3	81 43.5 09.8	Elnath	278 03.6 N28 37.6								
	08	74 36.2	289 52.1 03.9	266 37.6 06.5	32 28.6 55.4	96 46.1 09.9	Eltanin	90 42.3 N51 29.3								
	09	89 38.7	304 55.9 . 03.8	281 38.6 . 05.9	47 30.9 . 55.5	111 48.8 . 10.0	Enif	33 39.6 N 9 59.0								
	10	104 41.1	319 59.8 03.8	296 39.7 05.3	62 33.1 55.5	126 51.4 10.0	Fomalhaut	15 15.5 S29 29.7								
	11	119 43.6	335 03.6 03.8	311 40.7 04.6	77 35.3 55.6	141 54.0 10.1										
	12	134 46.1	350 07.5 N 7 03.8	326 41.7 N 6 04.0	92 37.6 N14 55.6	156 56.6 S11 10.2	Gacrux	171 53.3 S57 14.9								
	13	149 48.5	5 11.4 03.8	341 42.7 03.4	107 39.8 55.7	171 59.2 10.2	Gienah	175 45.0 S17 40.3								
	14	164 51.0	20 15.2 03.8	356 43.8 02.7	122 42.0 55.8	187 01.9 10.3	Hadar	148 37.8 S60 29.4								
	15	179 53.5	35 19.1 . 03.8	11 44.8 . 02.1	137 44.3 . 55.8	202 04.5 . 10.4	Hamal	327 52.5 N23 34.4								
	16	194 55.9	50 23.0 03.8	26 45.8 01.5	152 46.5 55.9	217 07.1 10.4	Kaus Aust.	83 33.7 S34 22.4								
	17	209 58.4	65 26.9 03.7	41 46.8 00.8	167 48.8 55.9	232 09.7 10.5										
	18	225 00.9	80 30.7 N 7 03.7	56 47.9 N 6 00.2	182 51.0 N14 56.0	247 12.3 S11 10.6	Kochab	137 19.7 N74 03.8								
	19	240 03.3	95 34.6 03.7	71 48.9 5 59.6	197 53.2 56.0	262 15.0 10.6	Markab	13 30.8 N15 19.9								
	20	255 05.8	110 38.5 03.7	86 49.9 59.0	212 55.5 56.1	277 17.6 10.7	Menkar	314 07.4 N 4 11.0								
	21	270 08.2	125 42.4 . 03.7	101 50.9 . 58.3	227 57.7 . 56.2	292 20.2 . 10.8	Menkent	147 59.1 S36 29.2								
	22	285 10.7	140 46.3 03.7	116 52.0 57.7	243 00.0 56.2	307 22.8 10.8	Miaplacidus	221 39.5 S69 48.8								
	23	300 13.2	155 50.1 03.7	131 53.0 57.1	258 02.2 56.3	322 25.5 10.9										
	MONDAY	7 00	315 15.6	170 54.0 N 7 03.7	146 54.0 N 5 56.4	273 04.4 N14 56.3	337 28.1 S11 11.0	Mirfak	308 30.0 N49 56.5							
01		330 18.1	185 57.9 03.7	161 55.0 55.8	288 06.7 56.4	352 30.7 11.0	Nunki	75 48.9 S26 16.0								
02		345 20.6	201 01.8 03.8	176 56.1 55.2	303 08.9 56.5	7 33.3 11.1	Peacock	53 07.0 S56 39.5								
03		0 23.0	216 05.7 . 03.8	191 57.1 . 54.5	318 11.2 . 56.5	22 35.9 . 11.2	Pollux	243 19.1 N27 58.2								
04		15 25.5	231 09.6 03.8	206 58.1 53.9	333 13.4 56.6	37 38.6 11.2	Procyon	244 52.4 N 5 10.0								
05		30 28.0	246 13.5 03.8	221 59.1 53.3	348 15.6 56.6	52 41.2 11.3										
06		45 30.4	261 17.4 N 7 03.8	237 00.1 N 5 52.6	3 17.9 N14 56.7	67 43.8 S11 11.4	Rasalhague	95 59.4 N12 32.7								
07		60 32.9	276 21.3 03.8	252 01.2 52.0	18 20.1 56.7	82 46.4 11.5	Regulus	207 36.0 N11 51.3								
08		75 35.4	291 25.2 03.8	267 02.2 51.4	33 22.4 56.8	97 49.1 11.5	Rigel	281 05.2 S 8 10.3								
09		90 37.8	306 29.1 . 03.8	282 03.2 . 50.8	48 24.6 . 56.9	112 51.7 . 11.6	Rigel Kent.	139 42.0 S60 56.1								
10		105 40.3	321 33.0 03.9	297 04.2 50.1	63 26.9 56.9	127 54.3 11.7	Sabik	102 03.9 S15 45.2								
11		120 42.7	336 36.9 03.9	312 05.3 49.5	78 29.1 57.0	142 56.9 11.7										
12		135 45.2	351 40.9 N 7 03.9	327 06.3 N 5 48.9	93 31.3 N14 57.0	157 59.5 S11 11.8	Schedar	349 32.1 N56 39.8								
13		150 47.7	6 44.8 03.9	342 07.3 48.2	108 33.6 57.1	173 02.2 11.9	Shaula	96 11.7 S37 07.3								
14		165 50.1	21 48.7 04.0	357 08.3 47.6	123 35.8 57.2	188 04.8 11.9	Sirius	258 27.6 S16 44.7								
15		180 52.6	36 52.6 . 04.0	12 09.4 . 47.0	138 38.1 . 57.2	203 07.4 . 12.0	Spica	158 23.7 S11 17.0								
16		195 55.1	51 56.5 04.0	27 10.4 46.3	153 40.3 57.3	218 10.0 12.1	Suhail	222 47.6 S43 31.6								
17		210 57.5	67 00.4 04.0	42 11.4 45.7	168 42.6 57.3	233 12.7 12.1										
18		226 00.0	82 04.4 N 7 04.1	57 12.4 N 5 45.1	183 44.8 N14 57.4	248 15.3 S11 12.2	Vega	80 33.7 N38 48.5								
19		241 02.5	97 08.3 04.1	72 13.4 44.4	198 47.1 57.4	263 17.9 12.3	Zuben'ubi	136 57.3 S16 08.4								
20		256 04.9	112 12.2 04.1	87 14.5 43.8	213 49.3 57.5	278 20.5 12.3										
21		271 07.4	127 16.2 . 04.2	102 15.5 . 43.2	228 51.6 . 57.5	293 23.2 . 12.4										
22		286 09.9	142 20.1 04.2	117 16.5 42.5	243 53.8 57.6	308 25.8 12.5										
23		301 12.3	157 24.0 04.3	132 17.5 41.9	258 56.0 57.7	323 28.4 12.5										

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise						
										5	6		7	8					
	GHA	Dec	GHA	v	Dec	d	HP	Naut.				Civil			h m	h m	h m	h m	h m
d h	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	°	h m	h m	h m	h m	h m	h m	h m	h m	h m	
SATURDAY	5 00	178 28.5	N17 05.7		314 08.3	11.0 S	3	07.1	17.1	60.2	N 72	////	////	00 53	21 12	20 34	19 41		
	01	193 28.6	05.0		328 38.3	11.1	2	50.0	17.1	60.2	N 70	////	////	02 02	21 15	20 47	20 10	18 53	
	02	208 28.6	04.4		343 08.4	11.2	2	32.9	17.1	60.2	68	////	////	02 38	21 18	20 58	20 33	19 53	
	03	223 28.7	03.7		357 38.6	11.2	2	15.8	17.0	60.1	66	////	01 21	03 03	21 21	21 07	20 50	20 28	
	04	238 28.8	03.0		12 08.8	11.3	1	58.8	17.1	60.1	64	////	02 05	03 23	21 23	21 14	21 05	20 53	
	05	253 28.8	02.3		26 39.1	11.3	1	41.7	17.1	60.1	62	////	02 33	03 39	21 25	21 21	21 17	21 13	
	06	268 28.9	N17 01.7		41 09.4	11.3 S	1	24.6	17.0	60.0	60	01 13	02 55	03 52	21 26	21 27	21 27	21 30	
	07	283 28.9	01.0		55 39.7	11.4	1	07.6	17.0	60.0	N 58	01 53	03 12	04 03	21 28	21 32	21 37	21 44	
	08	298 29.0	17 00.3		70 10.1	11.4	0	50.6	17.1	60.0	56	02 19	03 26	04 13	21 29	21 36	21 45	21 56	
	09	313 29.1	16 59.6		84 40.5	11.5	0	33.5	17.0	59.9	54	02 39	03 38	04 21	21 31	21 41	21 52	22 06	
	10	328 29.1	59.0		99 11.0	11.5 S	0	16.5	16.9	59.9	52	02 55	03 49	04 29	21 32	21 44	21 58	22 16	
	11	343 29.2	58.3		113 41.5	11.5 N	0	00.4	17.0	59.9	50	03 09	03 58	04 36	21 33	21 48	22 04	22 24	
	12	358 29.3	N16 57.6		128 12.0	11.6 N	0	17.4	16.9	59.8	45	03 36	04 18	04 51	21 35	21 55	22 17	22 42	
	13	13 29.3	56.9		142 42.6	11.6	0	34.3	17.0	59.8	N 40	03 56	04 33	05 03	21 37	22 01	22 28	22 57	
	14	28 29.4	56.3		157 13.2	11.7	0	51.3	16.8	59.8	35	04 12	04 45	05 13	21 38	22 07	22 37	23 10	
	15	43 29.5	55.6		171 43.9	11.7	1	08.1	16.9	59.7	30	04 25	04 56	05 22	21 40	22 12	22 45	23 21	
	16	58 29.5	54.9		186 14.6	11.7	1	25.0	16.8	59.7	20	04 46	05 14	05 37	21 42	22 20	22 59	23 40	
	17	73 29.6	54.2		200 45.3	11.8	1	41.8	16.8	59.7	N 10	05 02	05 28	05 50	21 45	22 28	23 11	23 56	
	18	88 29.7	N16 53.6		215 16.1	11.7 N	1	58.6	16.8	59.6	0	05 16	05 41	06 02	21 47	22 35	23 23	24 12	
	19	103 29.7	52.9		229 46.8	11.8	2	15.4	16.8	59.6	S 10	05 27	05 53	06 15	21 49	22 42	23 35	24 28	
	20	118 29.8	52.2		244 17.6	11.9	2	32.2	16.7	59.6	20	05 38	06 04	06 27	21 52	22 50	23 47	24 45	
	21	133 29.9	51.5		258 48.5	11.8	2	48.9	16.6	59.5	30	05 48	06 17	06 42	21 54	22 58	24 02	00 02	
	22	148 29.9	50.8		273 19.3	11.9	3	05.5	16.7	59.5	35	05 54	06 24	06 50	21 56	23 04	24 10	00 10	
	23	163 30.0	50.2		287 50.2	11.9	3	22.2	16.6	59.4	40	05 59	06 31	07 00	21 58	23 09	24 20	00 20	
	SUNDAY	6 00	178 30.1	N16 49.5		302 21.1	11.9 N	3	38.8	16.5	59.4	S 50	06 11	06 49	07 24	22 03	23 25	24 45	00 45
		01	193 30.1	48.8		316 52.0	12.0	3	55.3	16.6	59.4	52	06 13	06 54	07 30	22 04	23 29	24 52	00 52
02		208 30.2	48.1		331 23.0	12.0	4	11.9	16.4	59.3	54	06 16	06 59	07 37	22 05	23 33	24 59	00 59	
03		223 30.3	47.4		345 54.0	11.9	4	28.3	16.5	59.3	56	06 19	07 04	07 45	22 07	23 38	25 08	01 08	
04		238 30.3	46.7		0 24.9	12.0	4	44.8	16.4	59.3	58	06 22	07 10	07 54	22 08	23 43	25 17	01 17	
05		253 30.4	46.1		14 55.9	12.0	5	01.2	16.3	59.2	S 60	06 26	07 16	08 03	22 10	23 49	25 28	01 28	
06		268 30.5	N16 45.4		29 26.9	12.1 N	5	17.5	16.3	59.2	Lat.		Twilight		Moonset				
07		283 30.5	44.7		43 58.0	12.0	5	33.8	16.2	59.2			Civil	Naut.	5	6	7	8	
08		298 30.6	44.0		58 29.0	12.1	5	50.0	16.2	59.1			h m	h m	h m	h m	h m	h m	
09		313 30.7	43.3		73 00.1	12.0	6	06.2	16.2	59.1	N 72	23 04	////	////	09 14	11 37	14 13		
10		328 30.7	42.6		87 31.1	12.1	6	22.4	16.1	59.0	N 70	22 04	////	////	09 15	11 27	13 45	16 46	
11		343 30.8	41.9		102 02.2	12.1	6	38.5	16.0	59.0	68	21 30	////	////	09 15	11 19	13 25	15 47	
12		358 30.9	N16 41.2		116 33.3	12.0 N	6	54.5	16.0	59.0	66	21 06	22 44	////	09 16	11 12	13 09	15 13	
13		13 31.0	40.6		131 04.3	12.1	7	10.5	15.9	58.9	64	20 47	22 03	////	09 16	11 06	12 56	14 49	
14		28 31.0	39.9		145 35.4	12.1	7	26.4	15.9	58.9	62	20 31	21 35	////	09 17	11 01	12 45	14 30	
15		43 31.1	39.2		160 06.5	12.1	7	42.3	15.8	58.9	60	20 18	21 15	22 52	09 17	10 57	12 35	14 14	
16		58 31.2	38.5		174 37.6	12.1	7	58.1	15.7	58.8	N 58	20 07	20 58	22 15	09 18	10 53	12 27	14 01	
17		73 31.2	37.8		189 08.7	12.1	8	13.8	15.7	58.8	56	19 58	20 44	21 50	09 18	10 50	12 20	13 50	
18		88 31.3	N16 37.1		203 39.8	12.1 N	8	29.5	15.7	58.7	54	19 49	20 32	21 31	09 18	10 47	12 14	13 40	
19		103 31.4	36.4		218 10.9	12.1	8	45.2	15.5	58.7	52	19 42	20 22	21 15	09 18	10 44	12 08	13 31	
20		118 31.5	35.7		232 42.0	12.1	9	00.7	15.5	58.7	50	19 35	20 13	21 01	09 19	10 42	12 03	13 24	
21		133 31.5	35.0		247 13.1	12.1	9	16.2	15.4	58.6	45	19 20	19 53	20 35	09 19	10 37	11 52	13 07	
22		148 31.6	34.3		261 44.2	12.0	9	31.6	15.4	58.6	N 40	19 09	19 38	20 15	09 20	10 32	11 43	12 53	
23		163 31.7	33.7		276 15.2	12.1	9	47.0	15.3	58.6	35	18 58	19 26	19 59	09 20	10 28	11 36	12 42	
MONDAY		7 00	178 31.7	N16 33.0		290 46.3	12.1 N	10	02.3	15.2	58.5	30	18 50	19 15	19 46	09 20	10 25	11 29	12 32
		01	193 31.8	32.3		305 17.4	12.0	10	17.5	15.2	58.5	20	18 35	18 58	19 25	09 21	10 19	11 17	12 15
	02	208 31.9	31.6		319 48.4	12.1	10	32.7	15.1	58.4	N 10	18 22	18 44	19 09	09 21	10 14	11 07	12 00	
	03	223 32.0	30.9		334 19.5	12.0	10	47.8	15.0	58.4	0	18 09	18 31	18 56	09 21	10 10	10 58	11 46	
	04	238 32.0	30.2		348 50.5	12.1	11	02.8	14.9	58.4	S 10	17 57	18 19	18 45	09 22	10 05	10 48	11 32	
	05	253 32.1	29.5		3 21.6	12.0	11	17.7	14.9	58.3	20	17 45	18 08	18 34	09 22	10 00	10 38	11 18	
	06	268 32.2	N16 28.8		17 52.6	12.0 N	11	32.6	14.8	58.3	30	17 30	17 55	18 24	09 22	09 54	10 27	11 01	
	07	283 32.3	28.1		32 23.6	12.0	11	47.4	14.7	58.3	35	17 22	17 49	18 19	09 23	09 51	10 20	10 51	
	08	298 32.3	27.4		46 54.6	11.9	12	02.1	14.6	58.2	40	17 13	17 41	18 13	09 23	09 47	10 13	10 40	
	09	313 32.4	26.7		61 25.5	12.0	12	16.7	14.6	58.2	45	17 02	17 33	18 08	09 23	09 43	10 04	10 27	
	10	328 32.5	26.0		75 56.5	11.9	12	31.3	14.4	58.1	S 50	16 48	17 23	18 02	09 23	09 38	09 54	10 12	
	11	343 32.6	25.3		90 27.4	11.9	12	45.7	14.4	58.1	52	16 42	17 19	17 59	09 23	09 36	09 49	10 05	
	12	358 32.6	N16 24.6		104 58.3	11.9 N	13	00.1	14.3	58.1	54	16 35	17 14	17 56	09 23	09 33	09 44	09 57	
	13	13 32.7	23.9		119 29.2	11.9	13	14.4	14.2	58.0	56	16 28	17 09	17 53	09 24	09 31	09 38	09 48	
	14	28 32.8	23.2		134 00.1	11.9	13	28.6	14.2	58.0	58	16 19	17 03	17 50	09 24	09 27	09 32	09 37	
15	43 32.9	22.5		148 31.0	11.8	13	42.8	14.0	58.0	S 60	16 09	16 56	17 47	09 24	09 24				

UT		ARIES		VENUS -4.1		MARS +1.8		JUPITER -2.4		SATURN +0.5		STARS			
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
TUESDAY	00	316 14.8	172 27.9	N 7 04.3	147 18.6	N 5 41.3	273 58.3	N14 57.7	338 31.0	S11 12.6	Acamar	315 12.7	S40 12.3		
	01	331 17.2	187 31.9	04.3	162 19.6	40.6	289 00.5	57.8	353 33.7	12.7	Achernar	335 20.8	S57 06.7		
	02	346 19.7	202 35.8	04.4	177 20.6	40.0	304 02.8	57.8	8 36.3	12.7	Acrux	173 01.8	S63 13.9		
	03	1 22.2	217 39.8	.. 04.4	192 21.6	.. 39.4	319 05.0	.. 57.9	23 38.9	.. 12.8	Adhara	255 07.1	S29 00.0		
	04	16 24.6	232 43.7	04.5	207 22.7	38.7	334 07.3	57.9	38 41.5	12.9	Aldebaran	290 41.1	N16 33.4		
	05	31 27.1	247 47.6	04.5	222 23.7	38.1	349 09.5	58.0	53 44.2	13.0					
	06	46 29.6	262 51.6	N 7 04.6	237 24.7	N 5 37.5	4 11.8	N14 58.1	68 46.8	S11 13.0	Alioth	166 14.3	N55 50.2		
	07	61 32.0	277 55.5	04.6	252 25.7	36.8	19 14.0	58.1	83 49.4	13.1	Alkaid	152 53.1	N49 12.0		
	08	76 34.5	292 59.5	04.7	267 26.8	36.2	34 16.3	58.2	98 52.0	13.2	Alnair	27 33.9	S46 50.7		
	09	91 37.0	308 03.4	.. 04.7	282 27.8	.. 35.6	49 18.5	.. 58.2	113 54.7	.. 13.2	Alnilam	275 39.1	S 1 11.1		
	10	106 39.4	323 07.4	04.8	297 28.8	34.9	64 20.8	58.3	128 57.3	13.3	Alphard	217 49.2	S 8 45.5		
	11	121 41.9	338 11.3	04.9	312 29.8	34.3	79 23.0	58.3	143 59.9	13.4					
	12	136 44.3	353 15.3	N 7 04.9	327 30.8	N 5 33.7	94 25.3	N14 58.4	159 02.5	S11 13.4	Alphecca	126 04.7	N26 38.3		
	13	151 46.8	8 19.2	05.0	342 31.9	33.0	109 27.5	58.4	174 05.2	13.5	Alpheratz	357 35.7	N29 13.2		
	14	166 49.3	23 23.2	05.0	357 32.9	32.4	124 29.8	58.5	189 07.8	13.6	Altair	62 00.8	N 8 55.9		
	15	181 51.7	38 27.1	.. 05.1	12 33.9	.. 31.8	139 32.0	.. 58.6	204 10.4	.. 13.6	Ankaa	353 08.0	S42 10.5		
	16	196 54.2	53 31.1	05.2	27 34.9	31.1	154 34.3	58.6	219 13.0	13.7	Antares	112 17.1	S26 29.1		
	17	211 56.7	68 35.1	05.2	42 36.0	30.5	169 36.5	58.7	234 15.7	13.8					
	18	226 59.1	83 39.0	N 7 05.3	57 37.0	N 5 29.9	184 38.8	N14 58.7	249 18.3	S11 13.8	Arcturus	145 49.0	N19 03.8		
	19	242 01.6	98 43.0	05.4	72 38.0	29.2	199 41.0	58.8	264 20.9	13.9	Atria	107 12.1	S69 04.4		
	20	257 04.1	113 47.0	05.4	87 39.0	28.6	214 43.3	58.8	279 23.5	14.0	Avior	234 15.9	S59 34.9		
	21	272 06.5	128 50.9	.. 05.5	102 40.0	.. 28.0	229 45.6	.. 58.9	294 26.2	.. 14.0	Bellatrix	278 24.3	N 6 22.3		
	22	287 09.0	143 54.9	05.6	117 41.1	27.3	244 47.8	58.9	309 28.8	14.1	Betelgeuse	270 53.6	N 7 24.8		
	23	302 11.5	158 58.9	05.7	132 42.1	26.7	259 50.1	59.0	324 31.4	14.2					
WEDNESDAY	00	317 13.9	174 02.8	N 7 05.8	147 43.1	N 5 26.1	274 52.3	N14 59.0	339 34.0	S11 14.3	Canopus	263 53.3	S52 42.2		
	01	332 16.4	189 06.8	05.8	162 44.1	25.4	289 54.6	59.1	354 36.7	14.3	Capella	280 23.9	N46 01.2		
	02	347 18.8	204 10.8	05.9	177 45.2	24.8	304 56.8	59.1	9 39.3	14.4	Deneb	49 26.1	N45 21.9		
	03	2 21.3	219 14.7	.. 06.0	192 46.2	.. 24.2	319 59.1	.. 59.2	24 41.9	.. 14.5	Denebola	182 26.4	N14 26.6		
	04	17 23.8	234 18.7	06.1	207 47.2	23.5	335 01.3	59.3	39 44.5	14.5	Diphda	348 48.3	S17 51.3		
	05	32 26.2	249 22.7	06.2	222 48.2	22.9	350 03.6	59.3	54 47.2	14.6					
	06	47 28.7	264 26.7	N 7 06.2	237 49.3	N 5 22.3	5 05.9	N14 59.4	69 49.8	S11 14.7	Dubhe	193 43.0	N61 37.7		
	07	62 31.2	279 30.6	06.3	252 50.3	21.6	20 08.1	59.4	84 52.4	14.7	Elnath	278 03.6	N28 37.6		
	08	77 33.6	294 34.6	06.4	267 51.3	21.0	35 10.4	59.5	99 55.0	14.8	Eltanin	90 42.4	N51 29.3		
	09	92 36.1	309 38.6	.. 06.5	282 52.3	.. 20.4	50 12.6	.. 59.5	114 57.7	.. 14.9	Enif	33 39.6	N 9 59.0		
	10	107 38.6	324 42.6	06.6	297 53.3	19.7	65 14.9	59.6	130 00.3	14.9	Fomalhaut	15 15.5	S29 29.7		
	11	122 41.0	339 46.6	06.7	312 54.4	19.1	80 17.1	59.6	145 02.9	15.0					
	12	137 43.5	354 50.6	N 7 06.8	327 55.4	N 5 18.4	95 19.4	N14 59.7	160 05.5	S11 15.1	Gacrux	171 53.3	S57 14.8		
	13	152 46.0	9 54.5	06.9	342 56.4	17.8	110 21.7	59.7	175 08.2	15.2	Gienah	175 45.0	S17 40.3		
	14	167 48.4	24 58.5	07.0	357 57.4	17.2	125 23.9	59.8	190 10.8	15.2	Hadar	148 37.8	S60 29.4		
	15	182 50.9	40 02.5	.. 07.1	12 58.5	.. 16.5	140 26.2	.. 59.8	205 13.4	.. 15.3	Hamal	327 52.4	N23 34.4		
	16	197 53.3	55 06.5	07.2	27 59.5	15.9	155 28.4	59.9	220 16.1	15.4	Kaus Aust.	83 33.8	S34 22.4		
	17	212 55.8	70 10.5	07.3	43 00.5	15.3	170 30.7	14 59.9	235 18.7	15.4					
	18	227 58.3	85 14.5	N 7 07.4	58 01.5	N 5 14.6	185 32.9	N15 00.0	250 21.3	S11 15.5	Kochab	137 19.8	N74 03.8		
	19	243 00.7	100 18.5	07.5	73 02.5	14.0	200 35.2	00.1	265 23.9	15.6	Markab	13 30.8	N15 19.9		
	20	258 03.2	115 22.5	07.6	88 03.6	13.4	215 37.5	00.1	280 26.6	15.6	Menkar	314 07.4	N 4 11.0		
	21	273 05.7	130 26.5	.. 07.7	103 04.6	.. 12.7	230 39.7	.. 00.2	295 29.2	.. 15.7	Menkent	147 59.1	S36 29.2		
	22	288 08.1	145 30.5	07.8	118 05.6	12.1	245 42.0	00.2	310 31.8	15.8	Miaplacidus	221 39.5	S69 48.7		
	23	303 10.6	160 34.5	07.9	133 06.6	11.5	260 44.3	00.3	325 34.4	15.8					
THURSDAY	00	318 13.1	175 38.5	N 7 08.1	148 07.7	N 5 10.8	275 46.5	N15 00.3	340 37.1	S11 15.9	Mirfak	308 30.0	N49 56.5		
	01	333 15.5	190 42.5	08.2	163 08.7	10.2	290 48.8	00.4	355 39.7	16.0	Nunki	75 48.9	S26 16.0		
	02	348 18.0	205 46.5	08.3	178 09.7	09.5	305 51.0	00.4	10 42.3	16.0	Peacock	53 07.0	S56 39.6		
	03	3 20.4	220 50.5	.. 08.4	193 10.7	.. 08.9	320 53.3	.. 00.5	25 45.0	.. 16.1	Pollux	243 19.1	N27 58.2		
	04	18 22.9	235 54.5	08.5	208 11.7	08.3	335 55.6	00.5	40 47.6	16.2	Procyon	244 52.4	N 5 10.0		
	05	33 25.4	250 58.5	08.6	223 12.8	07.6	350 57.8	00.6	55 50.2	16.3					
	06	48 27.8	266 02.5	N 7 08.8	238 13.8	N 5 07.0	6 00.1	N15 00.6	70 52.8	S11 16.3	Rasalhague	95 59.4	N12 32.7		
	07	63 30.3	281 06.5	08.9	253 14.8	06.4	21 02.4	00.7	85 55.5	16.4	Regulus	207 36.0	N11 51.3		
	08	78 32.8	296 10.5	09.0	268 15.8	05.7	36 04.6	00.7	100 58.1	16.5	Rigel	281 05.2	S 8 10.3		
	09	93 35.2	311 14.5	.. 09.1	283 16.9	.. 05.1	51 06.9	.. 00.8	116 00.7	.. 16.5	Rigel Kent.	139 42.0	S60 56.1		
	10	108 37.7	326 18.5	09.3	298 17.9	04.4	66 09.1	00.8	131 03.4	16.6	Sabik	102 03.9	S15 45.2		
	11	123 40.2	341 22.5	09.4	313 18.9	03.8	81 11.4	00.9	146 06.0	16.7					
	12	138 42.6	356 26.5	N 7 09.5	328 19.9	N 5 03.2	96 13.7	N15 00.9	161 08.6	S11 16.7	Schedar	349 32.1	N56 39.8		
	13	153 45.1	11 30.5	09.6	343 20.9	02.5	111 15.9	01.0	176 11.2	16.8	Shaula	96 11.7	S37 07.3		
	14	168 47.6	26 34.5	09.8	358 22.0	01.9	126 18.2	01.0	191 13.9	16.9	Sirius	258 27.6	S16 44.7		
	15	183 50.0	41 38.5	.. 09.9	13 23.0	.. 01.3	141 20.5	.. 01.1	206 16.5	.. 17.0	Spica	158 23.7	S11 17.0		
	16	198 52.5	56 42.5	10.0	28 24.0	00.6	156 22.7	01.1	221 19.1	17.0	Suhail	222 47.6	S43 31.5		
	17	213 54.9	71 46.5	10.2	43 25.0	5 00.0	171 25.0	01.2	236 21.8	17.1					
	18	228 57.4	86 50.5	N 7 10.3	58 26.1	N 4 59.4	186 27.3	N15 01.2	251 24.4	S11 17.2	Vega	80 33.7	N38 48.5		
	19	243 59.9	101 54.6	10.5	73 27.1	58.7	201 29.5	01.3	266 27.0	17.2	Zuben'ubi	136 57.3	S16 08.4		
	20	259 02.3	116 58.6	10.6	88 28.1	58.1	216 31.8	01.3	281 29.6	17.3					
	21	274 04.8	132 02.6	.. 10.7	103 29.1	.. 57.4	231 34.1	.. 01.4	296 32.3	.. 17.4					
	22	289 07.3	147 06.6	10.9	118 30.1	56.8	246 36.3	01.4	311 34.9	17.4	Venus	216 48.9	12 21		
	23	304 09.7	162 10.6	11.0	133 31.2	56.2	261 38.6	01.5	326 37.5	17.5	Mars	190 29.2	14 08		
		h m									Jupiter	317 38.4	5 40		
Mer. Pass.		2 50.6	v 4.0	d 0.1	v 1.0	d 0.6	v 2.3	d 0.1	v 2.6	d 0.1	Saturn	22 20.1	1 21		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	8		9	10	11		
d h	° /	° /	° /	° /	° /	° /	°	h m	h m	h m	h m	h m	h m	h m	h m		
8	00	178 33.6	N16 16.2	279 07.6	11.6	N15 46.1	13.2	57.6	N 72	////	////	01 32					
	01	193 33.7	15.5	293 38.2	11.6	15 59.3	13.2	57.6	N 70	////	////	02 21	18 53				
	02	208 33.7	14.8	308 08.8	11.6	16 12.5	13.0	57.5	68	////	00 15	02 52	19 53				
	03	223 33.8	14.1	322 39.4	11.5	16 25.5	13.0	57.5	66	////	01 44	03 15	20 28	19 35			
	04	238 33.9	13.4	337 09.9	11.5	16 38.5	12.8	57.5	64	////	02 19	03 32	20 53	20 35			
	05	253 34.0	12.7	351 40.4	11.4	16 51.3	12.8	57.4	62	00 14	02 44	03 47	21 13	21 10	21 07	21 08	
	06	268 34.1	N16 11.9	360 10.8	11.4	N17 04.1	12.6	57.4	60	01 33	03 04	03 59	21 30	21 35	21 47	22 15	
	07	283 34.1	11.2	2 41.2	11.4	17 16.7	12.6	57.4	N 58	02 06	03 20	04 09	21 44	21 55	22 15	22 49	
	08	298 34.2	10.5	35 11.6	11.4	17 29.3	12.4	57.3	56	02 29	03 33	04 19	21 56	22 12	22 36	23 15	
	09	313 34.3	09.8	49 42.0	11.3	17 41.7	12.4	57.3	54	02 47	03 44	04 27	22 06	22 26	22 54	23 35	
TUESDAY	10	328 34.4	09.1	64 12.3	11.3	17 54.1	12.2	57.3	52	03 02	03 54	04 34	22 16	22 38	23 09	23 52	
	11	343 34.5	08.4	78 42.6	11.2	18 06.3	12.2	57.2	50	03 15	04 03	04 40	22 24	22 49	23 23	24 06	
	12	358 34.5	N16 07.7	93 12.8	11.2	N18 18.5	12.0	57.2	45	03 41	04 21	04 54	22 42	23 12	23 50	24 36	
	13	13 34.6	07.0	107 40.3	11.2	18 30.5	12.0	57.2	N 40	04 00	04 36	05 06	22 57	23 31	24 11	00 11	
	14	28 34.7	06.3	122 13.2	11.1	18 42.5	11.8	57.1	35	04 15	04 48	05 15	23 10	23 47	24 29	00 29	
	15	43 34.8	05.6	136 43.3	11.1	18 54.3	11.7	57.1	30	04 28	04 58	05 24	23 21	24 00	00 00	00 45	
	16	58 34.9	04.9	151 13.4	11.1	19 06.0	11.6	57.1	20	04 48	05 15	05 38	23 40	24 24	00 24	01 11	
	17	73 35.0	04.1	165 43.5	11.0	19 17.6	11.5	57.0	N 10	05 03	05 29	05 51	23 56	24 44	00 44	01 34	
	18	88 35.0	N16 03.4	180 13.5	11.0	N19 29.1	11.4	57.0	0	05 16	05 41	06 02	24 12	00 12	01 03	01 55	
	19	103 35.1	02.7	194 43.5	11.0	19 40.5	11.3	56.9	S 10	05 27	05 52	06 14	24 28	00 28	01 22	02 17	
9	20	118 35.2	02.0	209 13.5	10.9	19 51.8	11.2	56.9	20	05 37	06 03	06 26	24 45	00 45	01 43	02 40	
	21	133 35.3	01.3	223 43.4	10.9	20 03.0	11.0	56.9	30	05 46	06 15	06 39	00 02	01 05	02 07	03 06	
	22	148 35.4	16 00.6	238 13.3	10.8	20 14.0	11.0	56.8	35	05 51	06 21	06 47	00 10	01 16	02 21	03 22	
	23	163 35.5	15 59.9	252 43.1	10.8	20 25.0	10.8	56.8	40	05 56	06 28	06 56	00 20	01 29	02 37	03 41	
	00	178 35.5	N15 59.1	267 12.9	10.8	N20 35.8	10.7	56.8	45	06 01	06 36	07 07	00 31	01 45	02 57	04 03	
	01	193 35.6	58.4	281 42.7	10.7	20 46.5	10.6	56.7	S 50	06 06	06 45	07 19	00 45	02 05	03 21	04 32	
	02	208 35.7	57.7	296 12.4	10.7	20 57.1	10.5	56.7	52	06 09	06 49	07 25	00 52	02 14	03 34	04 46	
	03	223 35.8	57.0	310 42.1	10.6	21 07.6	10.4	56.7	54	06 11	06 53	07 32	00 59	02 25	03 47	05 02	
	04	238 35.9	56.3	325 11.7	10.6	21 18.0	10.2	56.6	56	06 14	06 58	07 39	01 08	02 37	04 03	05 22	
	05	253 36.0	55.6	339 41.3	10.6	21 28.2	10.2	56.6	58	06 17	07 04	07 47	01 17	02 51	04 22	05 46	
WEDNESDAY	06	268 36.1	N15 54.8	354 10.9	10.5	N21 38.4	10.0	56.6	S 60	06 20	07 10	07 56	01 28	03 07	04 46	06 18	
	07	283 36.1	54.1	8 40.4	10.5	21 48.4	9.9	56.6	Lat.	Sunset	Twilight		Moonset				
	08	298 36.2	53.4	23 09.9	10.4	21 58.3	9.7	56.5			Civil	Naut.	8	9	10	11	
	09	313 36.3	52.7	37 39.3	10.4	22 08.0	9.7	56.5	°	h m	h m	h m	h m	h m	h m	h m	
	10	328 36.4	52.0	52 08.7	10.4	22 17.7	9.5	56.5	N 72	22 30	////	////					
	11	343 36.5	51.2	66 38.1	10.3	22 27.2	9.4	56.4	N 70	21 45	////	////	16 46				
	12	358 36.6	N15 50.5	81 07.4	10.3	N22 36.6	9.3	56.4	68	21 16	23 27	////	15 47				
	13	13 36.7	49.8	95 36.7	10.2	22 45.9	9.1	56.4	66	20 54	22 22	////	15 13	17 52			
	14	28 36.8	49.1	110 05.9	10.2	22 55.0	9.1	56.3	64	20 37	21 48	////	14 49	16 52			
	15	43 36.8	48.4	124 35.1	10.2	23 04.1	8.9	56.3	62	20 22	21 24	23 31	14 30	16 18	18 10	19 59	
10	16	58 36.9	47.6	139 04.3	10.1	23 13.0	8.8	56.3	60	20 10	21 05	22 33	14 14	15 54	17 30	18 53	
	17	73 37.0	46.9	153 33.4	10.1	23 21.8	8.6	56.2	N 58	20 00	20 49	22 02	14 01	15 34	17 03	18 18	
	18	88 37.1	N15 46.2	168 02.5	10.0	N23 30.4	8.5	56.2	56	19 51	20 36	21 39	13 50	15 18	16 41	17 53	
	19	103 37.2	45.5	182 31.5	10.0	23 38.9	8.4	56.2	54	19 43	20 25	21 22	13 40	15 04	16 24	17 33	
	20	118 37.3	44.7	197 00.5	10.0	23 47.3	8.3	56.2	52	19 36	20 15	21 07	13 31	14 52	16 09	17 16	
	21	133 37.4	44.0	211 29.5	10.0	23 55.6	8.1	56.1	50	19 30	20 07	20 54	13 24	14 42	15 56	17 01	
	22	148 37.5	43.3	225 58.5	9.8	24 03.7	8.0	56.1	45	19 16	19 49	20 29	13 07	14 20	15 29	16 32	
	23	163 37.6	42.6	240 27.3	9.9	24 11.7	7.9	56.1	N 40	19 05	19 34	20 10	12 53	14 02	15 08	16 09	
	00	178 37.7	N15 41.8	254 56.2	9.8	N24 19.6	7.8	56.0	35	18 55	19 23	19 55	12 42	13 47	14 51	15 50	
	01	193 37.7	41.1	269 25.0	9.8	24 27.4	7.6	56.0	30	18 47	19 13	19 43	12 32	13 34	14 36	15 34	
THURSDAY	02	208 37.8	40.4	283 53.8	9.8	24 35.0	7.5	56.0	20	18 33	18 56	19 23	12 15	13 13	14 10	15 06	
	03	223 37.9	39.7	298 22.6	9.7	24 42.5	7.3	55.9	N 10	18 20	18 42	19 08	12 00	12 54	13 48	14 43	
	04	238 38.0	38.9	312 51.3	9.7	24 49.8	7.2	55.9	0	18 09	18 30	18 55	11 46	12 36	13 28	14 21	
	05	253 38.1	38.2	327 20.0	9.6	24 57.0	7.1	55.9	S 10	17 58	18 19	18 45	11 32	12 19	13 08	13 59	
	06	268 38.2	N15 37.5	341 48.6	9.6	N25 04.1	7.0	55.9	20	17 46	18 08	18 35	11 18	12 00	12 46	13 35	
	07	283 38.3	36.8	356 17.2	9.6	25 11.1	6.8	55.8	30	17 32	17 57	18 25	11 01	11 39	12 21	13 08	
	08	298 38.4	36.0	10 45.8	9.6	25 17.9	6.6	55.8	35	17 24	17 51	18 21	10 51	11 26	12 06	12 52	
	09	313 38.5	35.3	25 14.4	9.5	25 24.5	6.6	55.8	40	17 15	17 44	18 16	10 40	11 12	11 49	12 33	
	10	328 38.6	34.6	39 42.9	9.5	25 31.1	6.4	55.8	45	17 05	17 36	18 11	10 27	10 55	11 29	12 10	
	11	343 38.7	33.8	54 11.4	9.5	25 37.5	6.3	55.7	S 50	16 52	17 27	18 05	10 12	10 34	11 03	11 41	
11	12	358 38.8	N15 33.1	68 39.9	9.4	N25 43.8	6.1	55.7	52	16 47	17 23	18 03	10 05	10 24	10 51	11 27	
	13	13 38.9	32.4	83 08.3	9.4	25 49.9	6.0	55.7	54	16 40	17 18	18 01	09 57	10 13	10 36	11 10	
	14	28 39.0	31.6	97 36.7	9.4	25 55.9	5.8	55.7	56	16 33	17 14	17 58	09 48	10 01	10 20	10 51	
	15	43 39.1	30.9	112 05.1	9.3	26 01.7	5.7	55.6	58	16 25	17 08	17 55	09 37	09 46	10 00	10 26	
	16	58 39.1	30.2	126 33.4	9.3	26 07.4	5.6	55.6	S 60	16 16	17 02	17 52	09 26	09 29	09 36	09 53	
	17	73 39.2	29.4	141 01.7	9.3	26 13.0	5.5	55.6	SUN			MOON					
	18	88 39.3	N15 28.7	155 30.0	9.3	N26 18.5	5.3	55.5	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
	19	103 39.4	28.0	169 58.3	9.3	26 23.8	5.1	55.5		00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
	20	118 39.5	27.2	184 26.6	9.2	26 28.9	5.0	55.5	8	05 46	05 42	12 06	05 34	17 59	22 49		
	21	133 39.6	26.5	198 54.8	9.2	26 33.9	4.9	55.5	9	05 38	05 34	12 06	06 24	18 50	23 39		
22	148 39.7	25.8	213 23.0	9.2	26 38.8	4.7	55.5	10	05 30	05 25	12 05	07 15	19 42	24 29			
23	163 39.8	25.0	227 51.2	9.2	N26 43.5	4.6	55.4										

UT	ARIES	VENUS -4.1			MARS +1.8		JUPITER -2.4			SATURN +0.5			STARS		
	GHA ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	Name	SHA ° / ' / "	Dec ° / ' / "	
F R I D A Y	11 00	319 12.2	177 14.6 N	7 11.2	148 32.2 N	4 55.5	276 40.9 N15	01.5	341 40.2 S11	17.6	Acamar	315 12.6 S40 12.3			
	01	334 14.7	192 18.6	11.3	163 33.2	54.9	291 43.1	01.6	356 42.8	17.6	Achernar	335 20.8 S57 06.7			
	02	349 17.1	207 22.7	11.5	178 34.2	54.2	306 45.4	01.6	11 45.4	17.7	Acru	173 01.8 S63 13.9			
	03	4 19.6	222 26.7	11.6	193 35.2	53.6	321 47.7	01.7	26 48.0	17.8	Adhara	255 07.1 S29 00.0			
	04	19 22.1	237 30.7	11.8	208 36.3	53.0	336 50.0	01.7	41 50.7	17.9	Aldebaran	290 41.1 N16 33.4			
	05	34 24.5	252 34.7	11.9	223 37.3	52.3	351 52.2	01.8	56 53.3	17.9					
	06	49 27.0	267 38.7 N	7 12.1	238 38.3 N	4 51.7	6 54.5 N15	01.8	71 55.9 S11	18.0	Alioth	166 14.3 N55 50.2			
	07	64 29.4	282 42.7	12.2	253 39.3	51.1	21 56.8	01.9	86 58.6	18.1	Alkaid	152 53.1 N49 12.0			
	08	79 31.9	297 46.8	12.4	268 40.4	50.4	36 59.0	01.9	102 01.2	18.1	Alnair	27 33.9 S46 50.7			
	09	94 34.4	312 50.8	12.5	283 41.4	49.8	52 01.3	02.0	117 03.8	18.2	Alnilam	275 39.1 S 1 11.1			
	10	109 36.8	327 54.8	12.7	298 42.4	49.1	67 03.6	02.0	132 06.5	18.3	Alphard	217 49.2 S 8 45.5			
	11	124 39.3	342 58.8	12.9	313 43.4	48.5	82 05.9	02.1	147 09.1	18.3					
	12	139 41.8	358 02.8 N	7 13.0	328 44.4 N	4 47.9	97 08.1 N15	02.1	162 11.7 S11	18.4	Alphecca	126 04.7 N26 38.3			
	13	154 44.2	13 06.9	13.2	343 45.5	47.2	112 10.4	02.2	177 14.3	18.5	Alpheratz	357 35.7 N29 13.2			
	14	169 46.7	28 10.9	13.4	358 46.5	46.6	127 12.7	02.2	192 17.0	18.6	Altair	62 00.8 N 8 55.9			
	15	184 49.2	43 14.9	13.5	13 47.5	45.9	142 14.9	02.3	207 19.6	18.6	Ankaa	353 08.0 S42 10.5			
	16	199 51.6	58 18.9	13.7	28 48.5	45.3	157 17.2	02.3	222 22.2	18.7	Antares	112 17.1 S26 29.1			
	17	214 54.1	73 23.0	13.9	43 49.5	44.7	172 19.5	02.4	237 24.9	18.8					
	18	229 56.6	88 27.0 N	7 14.0	58 50.6 N	4 44.0	187 21.8 N15	02.4	252 27.5 S11	18.8	Arcturus	145 49.1 N19 03.8			
	19	244 59.0	103 31.0	14.2	73 51.6	43.4	202 24.0	02.5	267 30.1	18.9	Atria	107 12.2 S69 04.4			
	20	260 01.5	118 35.0	14.4	88 52.6	42.7	217 26.3	02.5	282 32.8	19.0	Avior	234 15.8 S59 34.9			
	21	275 03.9	133 39.0	14.5	103 53.6	42.1	232 28.6	02.5	297 35.4	19.0	Bellatrix	278 24.3 N 6 22.3			
	22	290 06.4	148 43.1	14.7	118 54.6	41.5	247 30.9	02.6	312 38.0	19.1	Betelgeuse	270 53.6 N 7 24.8			
	23	305 08.9	163 47.1	14.9	133 55.7	40.8	262 33.1	02.6	327 40.6	19.2					
S A T U R D A Y	12 00	320 11.3	178 51.1 N	7 15.1	148 56.7 N	4 40.2	277 35.4 N15	02.7	342 43.3 S11	19.3	Canopus	263 53.3 S52 42.2			
	01	335 13.8	193 55.1	15.3	163 57.7	39.5	292 37.7	02.7	357 45.9	19.3	Capella	280 23.9 N46 01.2			
	02	350 16.3	208 59.2	15.4	178 58.7	38.9	307 40.0	02.8	12 48.5	19.4	Deneb	49 26.1 N45 21.9			
	03	5 18.7	224 03.2	15.6	193 59.8	38.3	322 42.2	02.8	27 51.2	19.5	Denebola	182 26.4 N14 26.6			
	04	20 21.2	239 07.2	15.8	209 00.8	37.6	337 44.5	02.9	42 53.8	19.5	Diphda	348 48.3 S17 51.3			
	05	35 23.7	254 11.2	16.0	224 01.8	37.0	352 46.8	02.9	57 56.4	19.6					
	06	50 26.1	269 15.3 N	7 16.2	239 02.8 N	4 36.3	7 49.1 N15	03.0	72 59.1 S11	19.7	Dubhe	193 43.0 N61 37.7			
	07	65 28.6	284 19.3	16.4	254 03.8	35.7	22 51.4	03.0	88 01.7	19.7	Elnath	278 03.5 N28 37.6			
	08	80 31.1	299 23.3	16.5	269 04.9	35.1	37 53.6	03.1	103 04.3	19.8	Eltanin	90 42.4 N51 29.3			
	09	95 33.5	314 27.3	16.7	284 05.9	34.4	52 55.9	03.1	118 07.0	19.9	Enif	33 39.6 N 9 59.0			
	10	110 36.0	329 31.4	16.9	299 06.9	33.8	67 58.2	03.2	133 09.6	20.0	Fomalhaut	15 15.5 S29 29.7			
	11	125 38.4	344 35.4	17.1	314 07.9	33.1	83 00.5	03.2	148 12.2	20.0					
	12	140 40.9	359 39.4 N	7 17.3	329 08.9 N	4 32.5	98 02.7 N15	03.3	163 14.9 S11	20.1	Gacrux	171 53.3 S57 14.8			
	13	155 43.4	14 43.4	17.5	344 10.0	31.9	113 05.0	03.3	178 17.5	20.2	Gienah	175 45.0 S17 40.3			
	14	170 45.8	29 47.5	17.7	359 11.0	31.2	128 07.3	03.3	193 20.1	20.2	Hadar	148 37.9 S60 29.4			
	15	185 48.3	44 51.5	17.9	14 12.0	30.6	143 09.6	03.4	208 22.7	20.3	Hamal	327 52.4 N23 34.4			
	16	200 50.8	59 55.5	18.1	29 13.0	29.9	158 11.9	03.4	223 25.4	20.4	Kaus Aust.	83 33.8 S34 22.4			
	17	215 53.2	74 59.5	18.3	44 14.0	29.3	173 14.2	03.5	238 28.0	20.4					
	18	230 55.7	90 03.6 N	7 18.5	59 15.1 N	4 28.7	188 16.4 N15	03.5	253 30.6 S11	20.5	Kochab	137 19.8 N74 03.8			
	19	245 58.2	105 07.6	18.7	74 16.1	28.0	203 18.7	03.6	268 33.3	20.6	Markab	13 30.8 N15 19.9			
	20	261 00.6	120 11.6	18.9	89 17.1	27.4	218 21.0	03.6	283 35.9	20.7	Menkar	314 07.4 N 4 11.0			
	21	276 03.1	135 15.6	19.1	104 18.1	26.7	233 23.3	03.7	298 38.5	20.7	Menkent	147 59.1 S36 29.2			
	22	291 05.5	150 19.7	19.3	119 19.1	26.1	248 25.6	03.7	313 41.2	20.8	Miaplacidus	221 39.5 S69 48.7			
	23	306 08.0	165 23.7	19.5	134 20.2	25.5	263 27.8	03.8	328 43.8	20.9					
S U N D A Y	13 00	321 10.5	180 27.7 N	7 19.7	149 21.2 N	4 24.8	278 30.1 N15	03.8	343 46.4 S11	20.9	Mirfak	308 30.0 N49 56.5			
	01	336 12.9	195 31.7	19.9	164 22.2	24.2	293 32.4	03.8	358 49.1	21.0	Nunki	75 48.9 S26 16.0			
	02	351 15.4	210 35.8	20.1	179 23.2	23.5	308 34.7	03.9	13 51.7	21.1	Peacock	53 07.0 S56 39.6			
	03	6 17.9	225 39.8	20.3	194 24.2	22.9	323 37.0	03.9	28 54.3	21.2	Pollux	243 19.1 N27 58.2			
	04	21 20.3	240 43.8	20.6	209 25.3	22.2	338 39.3	04.0	43 57.0	21.2	Procyon	244 52.4 N 5 10.0			
	05	36 22.8	255 47.8	20.8	224 26.3	21.6	353 41.5	04.0	58 59.6	21.3					
	06	51 25.3	270 51.8 N	7 21.0	239 27.3 N	4 21.0	8 43.8 N15	04.1	74 02.2 S11	21.4	Rasalhague	95 59.4 N12 32.7			
	07	66 27.7	285 55.9	21.2	254 28.3	20.3	23 46.1	04.1	89 04.9	21.4	Regulus	207 36.0 N11 51.3			
	08	81 30.2	300 59.9	21.4	269 29.3	19.7	38 48.4	04.2	104 07.5	21.5	Rigel	281 05.2 S 8 10.3			
	09	96 32.7	316 03.9	21.6	284 30.4	19.0	53 50.7	04.2	119 10.1	21.6	Rigel Kent.	139 42.0 S60 56.1			
	10	111 35.1	331 07.9	21.8	299 31.4	18.4	68 53.0	04.2	134 12.8	21.6	Sabik	102 03.9 S15 45.2			
	11	126 37.6	346 12.0	22.1	314 32.4	17.8	83 55.3	04.3	149 15.4	21.7					
	12	141 40.0	1 16.0 N	7 22.3	329 33.4 N	4 17.1	98 57.5 N15	04.3	164 18.0 S11	21.8	Schedar	349 32.0 N56 39.8			
	13	156 42.5	16 20.0	22.5	344 34.4	16.5	113 59.8	04.4	179 20.7	21.9	Shaula	96 11.7 S37 07.3			
	14	171 45.0	31 24.0	22.7	359 35.5	15.8	129 02.1	04.4	194 23.3	21.9	Sirius	258 27.5 S16 44.7			
	15	186 47.4	46 28.0	23.0	14 36.5	15.2	144 04.4	04.5	209 25.9	22.0	Spica	158 23.7 S11 17.0			
	16	201 49.9	61 32.1	23.2	29 37.5	14.5	159 06.7	04.5	224 28.6	22.1	Suhail	222 47.6 S43 31.5			
	17	216 52.4	76 36.1	23.4	44 38.5	13.9	174 09.0	04.6	239 31.2	22.1					
	18	231 54.8	91 40.1 N	7 23.6	59 39.5 N	4 13.3	189 11.3 N15	04.6	254 33.8 S11	22.2	Vega	80 33.7 N38 48.5			
	19	246 57.3	106 44.1	23.9	74 40.6	12.6	204 13.6	04.6	269 36.5	22.3	Zuben'ubi	136 57.3 S16 08.4			
	20	261 59.8	121 48.1	24.1	89 41.6	12.0	219 15.9	04.7	284 39.1	22.4					
	21	277 02.2	136 52.1	24.3	104 42.6	11.3	234 18.1	04.7	299 41.7	22.4					
	22	292 04.7	151 56.2	24.6	119 43.6	10.7	249 20.4	04.8	314 44.4	22.5					
	23	307 07.2	167 00.2	24.8	134 44.6	10.0	264 22.7	04.8	329 47.0	22.6					
Mer. Pass. 2 38.8		v 4.0 d 0.2		v 1.0 d 0.6		v 2.3 d 0.0		v 2.6 d 0.1							
											SHA Mer. Pass.				
											h m				
											Venus 218 39.8 12 01				
											Mars 188 45.4 14 03				
											Jupiter 317 24.1 5 29				
											Saturn 22 31.9 1 09				

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	11	12	13	14				
	°	'		°	'																
FRI DAY	d h	° <td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td></td></td>	° <td>'<td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td></td>	' <td>°<td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td></td>	° <td>'<td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td><td>h m</td></td>	' <td>h m</td> <td>h m</td> <td>h m</td> <td>h m</td> <td>h m</td> <td>h m</td> <td>h m</td> <td>h m</td>	h m	h m	h m	h m	h m	h m	h m	h m		
	11 00	178	39.9	N15	24.3	242	19.4	9.1	N26	48.1	4.5	55.4	N 70	////	////	01 59					
	01	193	40.0		23.6	256	47.5	9.1	26	52.6	4.3	55.4	N 70	////	////	02 39					
	02	208	40.1		22.8	271	15.6	9.2	26	56.9	4.2	55.4	68	////	01 13	03 05					
	03	223	40.2		22.1	285	43.8	9.1	27	01.1	4.0	55.3	66	////	02 03	03 26					
	04	238	40.3		21.3	300	11.9	9.0	27	05.1	3.9	55.3	64	////	02 33	03 42					
	05	253	40.4		20.6	314	39.9	9.1	27	09.0	3.7	55.3	62	01 05	02 55	03 55	21 08	22 08	23 55	25 39	
	06	268	40.5	N15	19.9	329	08.0	9.1	N27	12.7	3.6	55.3	60	01 50	03 13	04 06	22 15	23 11	24 33	00 33	
	07	283	40.6		19.1	343	36.1	9.0	27	16.3	3.5	55.2	N 58	02 18	03 27	04 16	22 49	23 45	24 59	00 59	
	08	298	40.7		18.4	358	04.1	9.1	27	19.8	3.3	55.2	56	02 39	03 40	04 24	23 15	24 10	00 10	01 20	
	09	313	40.8		17.7		12 32.2	9.0	27	23.1	3.2	55.2	54	02 55	03 50	04 32	23 35	24 30	00 30	01 38	
	10	328	40.9		16.9		27 00.2	9.0	27	26.3	3.0	55.2	52	03 09	04 00	04 39	23 52	24 47	00 47	01 52	
	11	343	41.0		16.2		41 28.2	9.0	27	29.3	2.9	55.2	50	03 21	04 08	04 45	24 06	00 06	01 01	02 05	
	12	358	41.1	N15	15.4		55 56.2	9.0	N27	32.2	2.7	55.1	45	03 45	04 25	04 58	24 36	00 36	01 30	02 32	
	13	13	41.2		14.7		70 24.2	9.0	27	34.9	2.6	55.1	N 40	04 03	04 39	05 08	00 11	00 59	01 53	02 52	
	14	28	41.3		13.9		84 52.2	9.0	27	37.5	2.4	55.1	35	04 18	04 50	05 17	00 29	01 18	02 12	03 10	
	15	43	41.4		13.2		99 20.2	9.0	27	39.9	2.4	55.1	30	04 30	05 00	05 25	00 45	01 34	02 28	03 24	
	16	58	41.5		12.5		113 48.2	9.0	27	42.3	2.1	55.0	20	04 49	05 16	05 39	01 11	02 02	02 55	03 50	
	17	73	41.6		11.7		128 16.2	9.1	27	44.4	2.0	55.0	N 10	05 03	05 29	05 51	01 34	02 26	03 19	04 11	
	18	88	41.7	N15	11.0		142 44.3	9.0	N27	46.4	1.9	55.0	0	05 15	05 40	06 02	01 55	02 48	03 41	04 31	
	19	103	41.8		10.2		157 12.3	9.0	27	48.3	1.7	55.0	S 10	05 26	05 51	06 12	02 17	03 11	04 03	04 52	
	20	118	41.9		09.5		171 40.3	9.0	27	50.0	1.6	55.0	20	05 35	06 01	06 24	02 40	03 35	04 26	05 13	
	21	133	42.0		08.7		186 08.3	9.0	27	51.6	1.5	54.9	30	05 44	06 12	06 37	03 06	04 02	04 53	05 38	
	22	148	42.1		08.0		200 36.3	9.0	27	53.1	1.3	54.9	35	05 48	06 18	06 44	03 22	04 19	05 09	05 52	
	23	163	42.2		07.2		215 04.3	9.0	27	54.4	1.1	54.9	40	05 52	06 24	06 53	03 41	04 38	05 28	06 09	
12 00	178	42.3	N15	06.5		229 32.3	9.1	N27	55.5	1.0	54.9	45	05 57	06 32	07 02	07 02	04 03	05 02	05 50	06 30	
01	193	42.4		05.8		244 00.4	9.0	27	56.5	0.9	54.9	S 50	06 02	06 40	07 14	04 32	05 32	06 19	06 55		
02	208	42.5		05.0		258 28.4	9.1	27	57.4	0.7	54.9	52	06 04	06 44	07 20	04 46	05 47	06 33	07 07		
03	223	42.6		04.3		272 56.5	9.1	27	58.1	0.6	54.8	54	06 06	06 48	07 26	05 02	06 04	06 50	07 21		
04	238	42.7		03.5		287 24.6	9.1	27	58.7	0.4	54.8	56	06 08	06 52	07 32	05 22	06 25	07 09	07 37		
05	253	42.8		02.8		301 52.7	9.1	27	59.1	0.3	54.8	58	06 11	06 57	07 40	05 46	06 51	07 33	07 56		
06	268	42.9	N15	02.0		316 20.8	9.1	N27	59.4	0.2	54.8	S 60	06 13	07 03	07 48	06 18	07 28	08 05	08 20		
07	283	43.0		01.3		330 48.9	9.1	27	59.6	0.0	54.8	Lat.		Sunset		Twilight		Moonset			
08	298	43.1		15 00.5		345 17.0	9.2	27	59.6	0.1	54.7					Civil	Naut.	11	12	13	14
09	313	43.2	14	59.8		359 45.2	9.2	27	59.5	0.3	54.7										
10	328	43.3		59.0		14 13.4	9.2	27	59.2	0.4	54.7										
11	343	43.4		58.3		28 41.6	9.2	27	58.8	0.6	54.7	N 72	22 04	////	////						
12	358	43.6	N14	57.5		43 09.8	9.2	N27	58.2	0.7	54.7	N 70	21 27	////	////						
13	13	43.7		56.8		57 38.0	9.3	27	57.5	0.8	54.7	68	21 02	22 48	////						
14	28	43.8		56.0		72 06.3	9.3	27	56.7	1.0	54.6	66	20 42	22 03	////				22 19		
15	43	43.9		55.3		86 34.6	9.3	27	55.7	1.1	54.6	64	20 26	21 34	////				21 20		
16	58	44.0		54.5		101 02.9	9.4	27	54.6	1.3	54.6	62	20 13	21 12	22 57	19 59	20 49	20 49	20 46		
17	73	44.1		53.7		115 31.3	9.4	27	53.3	1.4	54.6	60	20 02	20 55	22 16	18 53	19 46	20 11	20 21		
18	88	44.2	N14	53.0		129 59.7	9.4	N27	51.9	1.5	54.6	N 58	19 53	20 41	21 49	18 18	19 12	19 44	20 01		
19	103	44.3		52.2		144 28.1	9.5	27	50.4	1.7	54.6	56	19 44	20 29	21 29	17 53	18 47	19 22	19 45		
20	118	44.4		51.5		158 56.6	9.5	27	48.7	1.8	54.6	54	19 37	20 18	21 13	17 33	18 27	19 05	19 31		
21	133	44.5		50.7		173 25.1	9.5	27	46.9	1.9	54.5	52	19 30	20 09	20 59	17 16	18 10	18 50	19 18		
22	148	44.6		50.0		187 53.6	9.5	27	45.0	2.1	54.5	50	19 24	20 01	20 47	17 01	17 55	18 37	19 07		
23	163	44.7		49.2		202 22.1	9.6	27	42.9	2.3	54.5	45	19 12	19 44	20 24	16 32	17 26	18 10	18 45		
13 00	178	44.8	N14	48.5		216 50.7	9.7	N27	40.6	2.3	54.5	N 40	19 01	19 30	20 06	16 09	17 03	17 48	18 26		
01	193	44.9		47.7		231 19.4	9.6	27	38.3	2.5	54.5	35	18 52	19 19	19 52	15 50	16 44	17 31	18 11		
02	208	45.1		46.9		245 48.0	9.8	27	35.8	2.7	54.5	30	18 44	19 10	19 40	15 34	16 27	17 15	17 57		
03	223	45.2		46.2		260 16.8	9.7	27	33.1	2.7	54.5	20	18 31	18 54	19 21	15 06	16 00	16 49	17 34		
04	238	45.3		45.4		274 45.5	9.8	27	30.4	2.9	54.4	N 10	18 19	18 41	19 07	14 43	15 36	16 27	17 14		
05	253	45.4		44.7		289 14.3	9.9	27	27.5	3.1	54.4	0	18 09	18 30	18 55	14 21	15 14	16 05	16 55		
06	268	45.5	N14	43.9		303 43.2	9.9	N27	24.4	3.1	54.4	S 10	17 58	18 19	18 45	13 59	14 51	15 44	16 36		
07	283	45.6		43.2		318 12.1	9.9	27	21.3	3.3	54.4	20	17 47	18 09	18 35	13 35	14 28	15 22	16 16		
08	298	45.7		42.4		332 41.0	10.0	27	18.0	3.5	54.4	30	17 34	17 59	18 27	13 08	14 00	14 55	15 52		
09	313	45.8		41.6		347 10.0	10.0	27	14.5	3.5	54.4	35	17 26	17 53	18 23	12 52	13 43	14 39	15 38		
10	328	45.9		40.9		1 39.0	10.1	27	11.0	3.7	54.4	40	17 18	17 46	18 18	12 33	13 24	14 21	15 22		
11	343	46.0		40.1		16 08.1	10.1	27	07.3	3.9	54.4	45	17 08	17 39	18 14	12 10	13 01	13 59	15 02		
12	358	46.1	N14	39.4		30 37.2	10.2	N27	03.4	3.9	54.3	S 50	16 57	17 31	18 09	11 41	12 31	13 31	14 38		
13	13	46.3		38.6		45 06.4	10.2	26	59.5	4.1	54.3	52	16 51	17 27	18 07	11 27	12 16	13 17	14 26		
14	28	46.4		37.8		59 35.6	10.3	26	55.4	4.2	54.3	54	16 45	17 23	18 05	11 10	11 58	13 01	14 13		
15	43	46.5		37.1		74 04.9	10.3	26	51.2	4.4	54.3	56	16 39	17 19	18 03	10 51	11 37	12 41	13 1		

UT	ARIES		VENUS -4.1		MARS +1.8		JUPITER -2.5		SATURN +0.4		STARS								
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec						
MONDAY	00	322 09.6	182 04.2	N 7 25.0	149 45.7	N 4 09.4	279 25.0	N15 04.9	344 49.6	S11 22.6	Acamar	315 12.6	S40 12.3						
	01	337 12.1	197 08.2	25.3	164 46.7	08.8	294 27.3	04.9	359 52.3	22.7	Achernar	335 20.8	S57 06.7						
	02	352 14.5	212 12.2	25.5	179 47.7	08.1	309 29.6	04.9	14 54.9	22.8	Acrux	173 01.9	S63 13.9						
	03	7 17.0	227 16.2	25.7	194 48.7	07.5	324 31.9	05.0	29 57.5	22.9	Adhara	255 07.1	S29 00.0						
	04	22 19.5	242 20.2	26.0	209 49.7	06.8	339 34.2	05.0	45 00.2	22.9	Aldebaran	290 41.1	N16 33.4						
	05	37 21.9	257 24.3	26.2	224 50.8	06.2	354 36.5	05.1	60 02.8	23.0									
	06	52 24.4	272 28.3	N 7 26.5	239 51.8	N 4 05.5	9 38.8	N15 05.1	75 05.4	S11 23.1	Alioth	166 14.3	N55 50.2						
	07	67 26.9	287 32.3	26.7	254 52.8	04.9	24 41.1	05.2	90 08.1	23.1	Alkaid	152 53.1	N49 12.0						
	08	82 29.3	302 36.3	27.0	269 53.8	04.3	39 43.3	05.2	105 10.7	23.2	Alnair	27 33.9	S46 50.7						
	09	97 31.8	317 40.3	27.2	284 54.8	03.6	54 45.6	05.2	120 13.3	23.3	Alnilam	275 39.1	S 1 11.1						
	10	112 34.3	332 44.3	27.4	299 55.8	03.0	69 47.9	05.3	135 16.0	23.3	Alphard	217 49.2	S 8 45.5						
	11	127 36.7	347 48.3	27.7	314 56.9	02.3	84 50.2	05.3	150 18.6	23.4									
	12	142 39.2	2 52.3	N 7 27.9	329 57.9	N 4 01.7	99 52.5	N15 05.4	165 21.2	S11 23.5	Alphecca	126 04.7	N26 38.3						
	13	157 41.7	17 56.3	28.2	344 58.9	01.0	114 54.8	05.4	180 23.9	23.6	Alpheratz	357 35.7	N29 13.2						
	14	172 44.1	33 00.3	28.4	359 59.9	4 00.4	129 57.1	05.4	195 26.5	23.6	Altair	62 00.8	N 8 55.9						
	15	187 46.6	48 04.3	28.7	15 00.9	3 59.7	144 59.4	05.5	210 29.1	23.7	Ankaa	353 08.0	S42 10.5						
	16	202 49.0	63 08.3	28.9	30 02.0	59.1	160 01.7	05.5	225 31.8	23.8	Antares	112 17.1	S26 29.1						
	17	217 51.5	78 12.3	29.2	45 03.0	58.5	175 04.0	05.6	240 34.4	23.8									
	18	232 54.0	93 16.3	N 7 29.5	60 04.0	N 3 57.8	190 06.3	N15 05.6	255 37.0	S11 23.9	Arcturus	145 49.1	N19 03.8						
	19	247 56.4	108 20.3	29.7	75 05.0	57.2	205 08.6	05.7	270 39.7	24.0	Atria	107 12.2	S69 04.4						
	20	262 58.9	123 24.3	30.0	90 06.0	56.5	220 10.9	05.7	285 42.3	24.1	Avior	234 15.8	S59 34.9						
	21	278 01.4	138 28.3	30.2	105 07.1	55.9	235 13.2	05.7	300 44.9	24.1	Bellatrix	278 24.3	N 6 22.4						
	22	293 03.8	153 32.3	30.5	120 08.1	55.2	250 15.5	05.8	315 47.6	24.2	Betelgeuse	270 53.5	N 7 24.8						
	23	308 06.3	168 36.3	30.7	135 09.1	54.6	265 17.8	05.8	330 50.2	24.3									
TUESDAY	00	323 08.8	183 40.3	N 7 31.0	150 10.1	N 3 53.9	280 20.1	N15 05.9	345 52.8	S11 24.3	Canopus	263 53.3	S52 42.2						
	01	338 11.2	198 44.3	31.3	165 11.1	53.3	295 22.4	05.9	0 55.5	24.4	Capella	280 23.8	N46 01.2						
	02	353 13.7	213 48.3	31.5	180 12.1	52.7	310 24.7	05.9	15 58.1	24.5	Deneb	49 26.1	N45 21.9						
	03	8 16.1	228 52.3	31.8	195 13.2	52.0	325 27.0	06.0	31 00.8	24.6	Denebola	182 26.4	N14 26.6						
	04	23 18.6	243 56.3	32.1	210 14.2	51.4	340 29.3	06.0	46 03.4	24.6	Diphda	348 48.2	S17 51.3						
	05	38 21.1	259 00.3	32.3	225 15.2	50.7	355 31.6	06.1	61 06.0	24.7									
	06	53 23.5	274 04.3	N 7 32.6	240 16.2	N 3 50.1	10 33.9	N15 06.1	76 08.7	S11 24.8	Dubhe	193 43.0	N61 37.6						
	07	68 26.0	289 08.3	32.9	255 17.2	49.4	25 36.2	06.1	91 11.3	24.8	Elnath	278 03.5	N28 37.6						
	08	83 28.5	304 12.3	33.1	270 18.3	48.8	40 38.5	06.2	106 13.9	24.9	Eltanin	90 42.4	N51 29.3						
	09	98 30.9	319 16.3	33.4	285 19.3	48.1	55 40.8	06.2	121 16.6	25.0	Enif	33 39.6	N 9 59.0						
	10	113 33.4	334 20.2	33.7	300 20.3	47.5	70 43.1	06.3	136 19.2	25.1	Fomalhaut	15 15.4	S29 29.7						
	11	128 35.9	349 24.2	33.9	315 21.3	46.9	85 45.4	06.3	151 21.8	25.1									
	12	143 38.3	4 28.2	N 7 34.2	330 22.3	N 3 46.2	100 47.7	N15 06.3	166 24.5	S11 25.2	Gacrux	171 53.4	S57 14.8						
	13	158 40.8	19 32.2	34.5	345 23.3	45.6	115 50.0	06.4	181 27.1	25.3	Gienah	175 45.0	S17 40.3						
	14	173 43.3	34 36.2	34.8	0 24.4	44.9	130 52.3	06.4	196 29.7	25.3	Hadar	148 37.9	S60 29.4						
	15	188 45.7	49 40.2	35.0	15 25.4	44.3	145 54.6	06.5	211 32.4	25.4	Hamal	327 52.4	N23 34.4						
	16	203 48.2	64 44.1	35.3	30 26.4	43.6	160 56.9	06.5	226 35.0	25.5	Kaus Aust.	83 33.8	S34 22.4						
	17	218 50.6	79 48.1	35.6	45 27.4	43.0	175 59.2	06.5	241 37.7	25.6									
	18	233 53.1	94 52.1	N 7 35.9	60 28.4	N 3 42.3	191 01.5	N15 06.6	256 40.3	S11 25.6	Kochab	137 19.9	N74 03.8						
	19	248 55.6	109 56.1	36.2	75 29.5	41.7	206 03.8	06.6	271 42.9	25.7	Markab	13 30.7	N15 20.0						
	20	263 58.0	125 00.0	36.4	90 30.5	41.0	221 06.1	06.6	286 45.6	25.8	Menkar	314 07.3	N 4 11.0						
	21	279 00.5	140 04.0	36.7	105 31.5	40.4	236 08.4	06.7	301 48.2	25.8	Menkent	147 59.1	S36 29.2						
	22	294 03.0	155 08.0	37.0	120 32.5	39.8	251 10.7	06.7	316 50.8	25.9	Miaplacidus	221 39.5	S69 48.7						
	23	309 05.4	170 12.0	37.3	135 33.5	39.1	266 13.0	06.8	331 53.5	26.0									
WEDNESDAY	00	324 07.9	185 15.9	N 7 37.6	150 34.5	N 3 38.5	281 15.3	N15 06.8	346 56.1	S11 26.1	Mirfak	308 29.9	N49 56.5						
	01	339 10.4	200 19.9	37.9	165 35.6	37.8	296 17.6	06.8	1 58.7	26.1	Nunki	75 48.9	S26 16.0						
	02	354 12.8	215 23.9	38.1	180 36.6	37.2	311 19.9	06.9	17 01.4	26.2	Peacock	53 07.0	S56 39.6						
	03	9 15.3	230 27.8	38.4	195 37.6	36.5	326 22.2	06.9	32 04.0	26.3	Pollux	243 19.0	N27 58.2						
	04	24 17.8	245 31.8	38.7	210 38.6	35.9	341 24.5	07.0	47 06.6	26.3	Procyon	244 52.3	N 5 10.0						
	05	39 20.2	260 35.8	39.0	225 39.6	35.2	356 26.9	07.0	62 09.3	26.4									
	06	54 22.7	275 39.7	N 7 39.3	240 40.7	N 3 34.6	11 29.2	N15 07.0	77 11.9	S11 26.5	Rasalhague	95 59.4	N12 32.7						
	07	69 25.1	290 43.7	39.6	255 41.7	33.9	26 31.5	07.1	92 14.6	26.6	Regulus	207 36.0	N11 51.3						
	08	84 27.6	305 47.6	39.9	270 42.7	33.3	41 33.8	07.1	107 17.2	26.6	Rigel	281 05.1	S 8 10.3						
	09	99 30.1	320 51.6	40.2	285 43.7	32.6	56 36.1	07.1	122 19.8	26.7	Rigel Kent.	139 42.0	S60 56.1						
	10	114 32.5	335 55.6	40.5	300 44.7	32.0	71 38.4	07.2	137 22.5	26.8	Sabik	102 03.9	S15 45.2						
	11	129 35.0	350 59.5	40.8	315 45.7	31.4	86 40.7	07.2	152 25.1	26.8									
	12	144 37.5	6 03.5	N 7 41.1	330 46.8	N 3 30.7	101 43.0	N15 07.3	167 27.7	S11 26.9	Schedar	349 32.0	N56 39.8						
	13	159 39.9	21 07.4	41.4	345 47.8	30.1	116 45.3	07.3	182 30.4	27.0	Shaula	96 11.7	S37 07.3						
	14	174 42.4	36 11.4	41.7	0 48.8	29.4	131 47.6	07.3	197 33.0	27.1	Sirius	258 27.5	S16 44.7						
	15	189 44.9	51 15.3	42.0	15 49.8	28.8	146 49.9	07.4	212 35.6	27.1	Spica	158 23.7	S11 17.0						
	16	204 47.3	66 19.3	42.3	30 50.8	28.1	161 52.3	07.4	227 38.3	27.2	Suhail	222 47.6	S43 31.5						
	17	219 49.8	81 23.2	42.6	45 51.8	27.5	176 54.6	07.4	242 40.9	27.3									
	18	234 52.2	96 27.1	N 7 42.9	60 52.9	N 3 26.8	191 56.9	N15 07.5	257 43.6	S11 27.3	Vega	80 33.7	N38 48.5						
	19	249 54.7	111 31.1	43.2	75 53.9	26.2	206 59.2	07.5	272 46.2	27.4	Zuben'ubi	136 57.3	S16 08.4						
	20	264 57.2	126 35.0	43.5	90 54.9	25.5	222 01.5	07.5	287 48.8	27.5									
	21	279 59.6	141 39.0	43.8	105 55.9	24.9	237 03.8	07.6	302 51.5	27.6									
	22	295 02.1	156 42.9	44.1	120 56.9	24.2	252 06.1	07.6	317 54.1	27.6	Venus	220 31.6	h 11 42						
	23	310 04.6	171 46.8	44.4	135 57.9	23.6	267 08.4	07.7	332 56.7	27.7	Mars	187 01.4	h 13 58						
Mer.Pass. 2 27.0			v 4.0	d 0.3		v 1.0	d 0.6		v 2.3	d 0.0		v 2.6	d 0.1						

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
										14	15		16	17		
	GHA	Dec	GHA	ν	Dec	d	HP	Naut.		Civil	h m		h m	h m	h m	
MONDAY	d h	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	N 72	h m	h m	h m	h m	h m	h m	h m	h m
	00	178 47.5	N14 30.2	204 30.9	10.9	N26 07.6	5.5 54.2	N 70	////	////	02 22				03 09	
	01	193 47.6	29.4	219 00.8	10.9	26 02.1	5.6 54.2	N 68	////	////	02 55				00 48	03 42
	02	208 47.7	28.6	233 30.7	11.0	25 56.5	5.7 54.2	66	////	01 41	03 18				01 57	04 05
	03	223 47.8	27.9	248 00.7	11.0	25 50.8	5.8 54.2	64	////	02 19	03 36		00 08	02 32	04 23	
	04	238 48.0	27.1	262 30.7	11.1	25 45.0	5.9 54.2	62	01 30	03 06	04 03		01 06	02 58	04 38	
	05	253 48.1	26.3	277 00.8	11.2	25 39.1	6.1 54.2	60	02 05	03 22	04 13	25 39	01 39	03 17	04 50	
	06	268 48.2	N14 25.6	291 31.0	11.2	N25 33.0	6.2 54.2	N 58	02 29	03 35	04 22	00 33	02 03	03 33	05 00	
	07	283 48.3	24.8	306 01.2	11.3	25 26.8	6.3 54.1	56	02 48	03 47	04 30	00 59	02 22	03 47	05 09	
	08	298 48.4	24.0	320 31.5	11.3	25 20.5	6.4 54.1	54	03 03	03 57	04 37	01 20	02 38	03 58	05 17	
	09	313 48.5	23.3	335 01.8	11.4	25 14.1	6.5 54.1	52	03 16	04 05	04 43	01 38	02 52	04 08	05 24	
	10	328 48.7	22.5	349 32.2	11.5	25 07.6	6.6 54.1	50	03 27	04 13	04 49	01 52	03 04	04 17	05 30	
	11	343 48.8	21.7	4 02.7	11.5	25 01.0	6.8 54.1	45	03 50	04 29	05 01	02 05	03 15	04 25	05 36	
	12	358 48.9	N14 21.0	18 33.2	11.7	N24 54.2	6.8 54.1	N 40	04 07	04 42	05 11	02 32	03 36	04 42	05 48	
	13	13 49.0	20.2	33 03.9	11.6	24 47.4	7.0 54.1	35	04 21	04 53	05 20	03 54	04 56	05 57		
	14	28 49.1	19.4	47 34.5	11.8	24 40.4	7.1 54.1	30	04 32	05 02	05 27	03 10	04 09	05 08	06 06	
	15	43 49.2	18.6	62 05.3	11.8	24 33.3	7.2 54.1	20	04 50	05 17	05 40	03 24	04 22	05 18	06 13	
	16	58 49.4	17.9	76 36.1	11.9	24 26.1	7.3 54.1	N 10	05 04	05 29	05 51	04 43	05 35	06 26		
	17	73 49.5	17.1	91 07.0	11.9	24 18.8	7.4 54.1	0	05 15	05 40	06 01	04 54	05 46	06 37		
	18	88 49.6	N14 16.3	105 37.9	12.0	N24 11.4	7.5 54.1	S 10	05 25	05 50	06 11	05 51	06 43	07 34		
	19	103 49.7	15.5	120 08.9	12.1	24 03.9	7.6 54.1	20	05 33	05 59	06 22	06 30	07 21	08 12		
	20	118 49.8	14.8	134 40.0	12.2	23 56.3	7.7 54.0	30	05 41	06 09	06 34	05 38	06 29	07 19		
	21	133 49.9	14.0	149 11.2	12.2	23 48.6	7.8 54.0	35	05 45	06 15	06 41	05 52	06 43	07 34		
	22	148 50.1	13.2	163 42.4	12.3	23 40.8	8.0 54.0	40	05 49	06 21	06 49	06 09	06 43	07 12		
	23	163 50.2	12.4	178 13.7	12.3	23 32.8	8.0 54.0	45	05 53	06 27	06 58	06 30	07 00	07 25		
TUESDAY	00	178 50.3	N14 11.7	192 45.0	12.4	N23 24.8	8.1 54.0	S 50	05 57	06 35	07 09	06 55	07 21	07 41		
	01	193 50.4	10.9	207 16.4	12.5	23 16.7	8.2 54.0	52	05 59	06 38	07 14	07 07	07 31	07 49		
	02	208 50.5	10.1	221 47.9	12.6	23 08.5	8.4 54.0	54	06 00	06 42	07 19	07 21	07 42	07 57		
	03	223 50.7	09.3	236 19.5	12.6	23 00.1	8.4 54.0	56	06 02	06 46	07 25	07 37	07 55	08 06		
	04	238 50.8	08.6	250 51.1	12.7	22 51.7	8.5 54.0	58	06 04	06 50	07 32	07 56	08 09	08 17		
	05	253 50.9	07.8	265 22.8	12.8	22 43.2	8.7 54.0	S 60	06 06	06 55	07 40	08 20	08 26	08 29		
	06	268 51.0	N14 07.0	279 54.6	12.8	N22 34.5	8.7 54.0	Lat.	Sunset	Twilight		Moonset				
	07	283 51.1	06.2	294 26.4	12.9	22 25.8	8.8 54.0			Civil	Naut.	14	15	16	17	
	08	298 51.3	05.5	308 58.3	13.0	22 17.0	8.9 54.0					h m	h m	h m	h m	
	09	313 51.4	04.7	323 30.3	13.0	22 08.1	9.0 54.0	N 72	h m	h m	h m			22 27	21 34	
	10	328 51.5	03.9	338 02.3	13.1	21 59.1	9.1 54.0	N 70	21 41	23 40	////			23 16	21 52	
	11	343 51.6	03.1	352 34.4	13.2	21 50.0	9.2 54.0	68	21 10	22 21	////		22 06	21 27		
	12	358 51.8	N14 02.3	7 06.6	13.2	N21 40.8	9.3 54.0	66	20 48	22 21	////	22 19	21 29	21 08		
	13	13 51.9	01.6	21 38.8	13.4	21 31.5	9.4 54.0	64	20 30	21 45	////	21 20	21 03	20 52		
	14	28 52.0	00.8	36 11.2	13.3	21 22.1	9.4 54.0	62	20 16	21 20	23 43	21 20	21 03	20 52		
	15	43 52.1	14 00.0	50 43.5	13.5	21 12.7	9.6 54.0	60	20 04	21 01	22 33	20 46	20 43	20 39		
	16	58 52.2	13 59.2	65 16.0	13.5	21 03.1	9.6 54.0	60	19 54	20 45	22 01	20 21	20 26	20 27		
	17	73 52.4	58.4	79 48.5	13.6	20 53.5	9.7 54.0	N 58	19 45	20 32	21 37	20 01	20 12	20 18		
	18	88 52.5	N13 57.6	94 21.1	13.6	N20 43.8	9.8 53.9	56	19 38	20 21	21 19	19 45	19 59	20 09		
	19	103 52.6	56.9	108 53.7	13.7	20 34.0	9.9 53.9	54	19 31	20 11	21 04	19 31	19 49	20 01		
	20	118 52.7	56.1	123 26.4	13.8	20 24.1	10.0 53.9	52	19 25	20 03	20 51	19 18	19 39	19 54		
	21	133 52.9	55.3	137 59.2	13.9	20 14.1	10.0 53.9	50	19 19	19 55	20 40	19 07	19 30	19 48		
	22	148 53.0	54.5	152 32.1	13.9	20 04.1	10.2 53.9	45	19 07	19 39	20 18	18 45	19 12	19 35		
	23	163 53.1	53.7	167 05.0	14.0	19 53.9	10.2 53.9	N 40	18 57	19 26	20 01	18 26	18 57	19 23		
	WEDNESDAY	00	178 53.2	N13 52.9	181 38.0	14.0	N19 43.7	10.3 53.9	35	18 49	19 16	19 48	18 11	18 45	19 14	
01		193 53.4	52.2	196 11.0	14.1	19 33.4	10.4 53.9	30	18 41	19 07	19 36	17 57	18 33	19 05		
02		208 53.5	51.4	210 44.1	14.2	19 23.0	10.4 53.9	20	18 29	18 52	19 19	17 34	18 14	18 51		
03		223 53.6	50.6	225 17.3	14.2	19 12.6	10.6 53.9	N 10	18 18	18 40	19 05	17 14	17 57	18 38		
04		238 53.7	49.8	239 50.5	14.3	19 02.0	10.6 53.9	0	18 08	18 29	18 54	16 55	17 42	18 26		
05		253 53.9	49.0	254 23.8	14.4	18 51.4	10.7 53.9	S 10	17 58	18 20	18 45	16 36	17 26	18 13		
06		268 54.0	N13 48.2	268 57.2	14.4	N18 40.7	10.7 53.9	20	17 47	18 10	18 36	16 16	17 09	18 00		
07		283 54.1	47.4	283 30.6	14.5	18 30.0	10.9 53.9	30	17 35	18 00	18 28	15 52	16 49	17 45		
08		298 54.2	46.6	298 04.1	14.5	18 19.1	10.9 53.9	35	17 29	17 55	18 25	15 38	16 37	17 36		
09		313 54.4	45.9	312 37.6	14.6	18 08.2	10.9 53.9	40	17 21	17 49	18 21	15 22	16 24	17 26		
10		328 54.5	45.1	327 11.2	14.7	17 57.3	11.1 53.9	45	17 12	17 42	18 17	15 02	16 08	17 14		
11		343 54.6	44.3	341 44.9	14.7	17 46.2	11.1 53.9	S 50	17 01	17 35	18 13	14 38	15 49	16 59		
12		358 54.8	N13 43.5	356 18.6	14.8	N17 35.1	11.2 53.9	52	16 56	17 32	18 11	14 26	15 39	16 52		
13		13 54.9	42.7	10 52.4	14.9	17 23.9	11.3 53.9	54	16 51	17 28	18 10	14 13	15 29	16 45		
14		28 55.0	41.9	25 26.3	14.9	17 12.6	11.3 53.9	56	16 44	17 24	18 08	13 57	15 17	16 36		
15		43 55.1	41.1	40 00.2	14.9	17 01.3	11.4 53.9	58	16 38	17 20	18 06	13 38	15 03	16 27		
16		58 55.3	40.3	54 34.1	15.0	16 49.9	11.4 53.9	S 60	16 30	17 15	18 04	13 15	14 46	16 15		
17		73 55.4	39.5	69 08.1	15.1	16 38.5	11.6 53.9	Day	Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
18		88 55.5	N13 38.7	83 42.2	15.1	N16 26.9	11.6 53.9		00 ^h 12 ^h	Pass.	Upper	Lower	d	%		
19		103 55.7	38.0	98 16.3	15.2	16 15.3	11.6 53.9	14	04 50	04 45	12 05	10 43	23 07	28 3		
20		118 55.8	37.2	112 50.5	15.3	16 03.7	11.7 53.9	15	04 39	04 33	12 05	11 31	23 53	29 1		
21		133 55.9	36.4	127 24.8	15.3	15 52.0	11.8 53.9	16	04 27	04 21	12 04	12 15	24 37	00 0		
22		148 56.0	35.6	141 59.1	15.3	15 40.2	11.8 53.9									
23		163 56.2	34.8	156 33.4	15.4	N15 28.4	11.9 53.9									
		SD 15.8	d 0.8	SD 14.7	14.7	14.7										

UT	ARIES			VENUS -4.0			MARS +1.8			JUPITER -2.5			SATURN +0.4			STARS										
	GHA ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	GHA ° / ' / "	Dec ° / ' / "	Name	SHA ° / ' / "	Dec ° / ' / "												
T H U R S D A Y	17 00	325 07.0	186 50.8	N 7 44.7	150 59.0	N 3 22.9	282 10.7	N15 07.7	347 59.4	S11 27.8	Acamar	315 12.6	S40 12.3													
	01	340 09.5	201 54.7	45.0	166 00.0	22.3	297 13.1	07.7	3 02.0	27.8	Achernar	335 20.7	S57 06.7													
	02	355 12.0	216 58.6	45.3	181 01.0	21.6	312 15.4	07.8	18 04.7	27.9	Acrux	173 01.9	S63 13.9													
	03	10 14.4	232 02.6	45.6	196 02.0	21.0	327 17.7	07.8	33 07.3	28.0	Adhara	255 07.1	S29 00.0													
	04	25 16.9	247 06.5	45.9	211 03.0	20.4	342 20.0	07.8	48 09.9	28.1	Aldebaran	290 41.0	N16 33.4													
	05	40 19.4	262 10.4	46.2	226 04.0	19.7	357 22.3	07.9	63 12.6	28.1																
	06	55 21.8	277 14.3	N 7 46.6	241 05.1	N 3 19.1	12 24.6	N15 07.9	78 15.2	S11 28.2	Alioth	166 14.3	N55 50.2													
	07	70 24.3	292 18.2	46.9	256 06.1	18.4	27 26.9	07.9	93 17.8	28.3	Alkaid	152 53.1	N49 12.0													
	08	85 26.7	307 22.2	47.2	271 07.1	17.8	42 29.3	08.0	108 20.5	28.3	Alnair	27 33.9	S46 50.7													
	09	100 29.2	322 26.1	47.5	286 08.1	17.1	57 31.6	08.0	123 23.1	28.4	Anilam	275 39.1	S 1 11.1													
	10	115 31.7	337 30.0	47.8	301 09.1	16.5	72 33.9	08.0	138 25.8	28.5	Alphard	217 49.2	S 8 45.5													
	11	130 34.1	352 33.9	48.1	316 10.1	15.8	87 36.2	08.1	153 28.4	28.6																
	12	145 36.6	7 37.8	N 7 48.4	331 11.2	N 3 15.2	102 38.5	N15 08.1	168 31.0	S11 28.6	Alphecca	126 04.7	N26 38.3													
	13	160 39.1	22 41.7	48.8	346 12.2	14.5	117 40.8	08.1	183 33.7	28.7	Alpheratz	357 35.7	N29 13.2													
	14	175 41.5	37 45.6	49.1	1 13.2	13.9	132 43.2	08.2	198 36.3	28.8	Altair	62 00.8	N 8 55.9													
	15	190 44.0	52 49.5	49.4	16 14.2	13.2	147 45.5	08.2	213 38.9	28.8	Ankaa	353 07.9	S42 10.5													
	16	205 46.5	67 53.4	49.7	31 15.2	12.6	162 47.8	08.3	228 41.6	28.9	Antares	112 17.2	S26 29.1													
	17	220 48.9	82 57.4	50.0	46 16.2	11.9	177 50.1	08.3	243 44.2	29.0																
	18	235 51.4	98 01.3	N 7 50.4	61 17.3	N 3 11.3	192 52.4	N15 08.3	258 46.9	S11 29.1	Arcturus	145 49.1	N19 03.8													
	19	250 53.9	113 05.1	50.7	76 18.3	10.6	207 54.8	08.4	273 49.5	29.1	Atria	107 12.2	S69 04.4													
	20	265 56.3	128 09.0	51.0	91 19.3	10.0	222 57.1	08.4	288 52.1	29.2	Avior	234 15.8	S59 34.9													
	21	280 58.8	143 12.9	51.3	106 20.3	09.3	237 59.4	08.4	303 54.8	29.3	Bellatrix	278 24.3	N 6 22.4													
	22	296 01.2	158 16.8	51.7	121 21.3	08.7	253 01.7	08.5	318 57.4	29.3	Betelgeuse	270 53.5	N 7 24.8													
	23	311 03.7	173 20.7	52.0	136 22.3	08.0	268 04.0	08.5	334 00.0	29.4																
F R I D A Y	18 00	326 06.2	188 24.6	N 7 52.3	151 23.3	N 3 07.4	283 06.4	N15 08.5	349 02.7	S11 29.5	Canopus	263 53.3	S52 42.2													
	01	341 08.6	203 28.5	52.6	166 24.4	06.7	298 08.7	08.6	4 05.3	29.6	Capella	280 23.8	N46 01.2													
	02	356 11.1	218 32.4	53.0	181 25.4	06.1	313 11.0	08.6	19 08.0	29.6	Deneb	49 26.1	N45 21.9													
	03	11 13.6	233 36.3	53.3	196 26.4	05.4	328 13.3	08.6	34 10.6	29.7	Denebola	182 26.4	N14 26.6													
	04	26 16.0	248 40.1	53.6	211 27.4	04.8	343 15.6	08.7	49 13.2	29.8	Diphda	348 48.2	S17 51.3													
	05	41 18.5	263 44.0	54.0	226 28.4	04.1	358 18.0	08.7	64 15.9	29.9																
	06	56 21.0	278 47.9	N 7 54.3	241 29.4	N 3 03.5	13 20.3	N15 08.7	79 18.5	S11 29.9	Dubhe	193 43.0	N61 37.6													
	07	71 23.4	293 51.8	54.6	256 30.5	02.8	28 22.6	08.8	94 21.2	30.0	Elnath	278 03.5	N28 37.6													
	08	86 25.9	308 55.6	54.9	271 31.5	02.2	43 24.9	08.8	109 23.8	30.1	Eltanin	90 42.4	N51 29.4													
	09	101 28.3	323 59.5	55.3	286 32.5	01.5	58 27.3	08.8	124 26.4	30.1	Enif	33 39.6	N 9 59.1													
	10	116 30.8	339 03.4	55.6	301 33.5	00.9	73 29.6	08.9	139 29.1	30.2	Fomalhaut	15 15.4	S29 29.7													
	11	131 33.3	354 07.2	56.0	316 34.5	3 00.3	88 31.9	08.9	154 31.7	30.3																
	12	146 35.7	9 11.1	N 7 56.3	331 35.5	N 2 59.6	103 34.2	N15 08.9	169 34.3	S11 30.4	Gacrux	171 53.4	S57 14.8													
	13	161 38.2	24 15.0	56.6	346 36.6	59.0	118 36.6	09.0	184 37.0	30.4	Gienah	175 45.0	S17 40.3													
	14	176 40.7	39 18.8	57.0	1 37.6	58.3	133 38.9	09.0	199 39.6	30.5	Hadar	148 37.9	S60 29.4													
	15	191 43.1	54 22.7	57.3	16 38.6	57.7	148 41.2	09.0	214 42.3	30.6	Hamal	327 52.4	N23 34.4													
	16	206 45.6	69 26.5	57.6	31 39.6	57.0	163 43.5	09.0	229 44.9	30.6	Kaus Aust.	83 33.8	S34 22.5													
	17	221 48.1	84 30.4	58.0	46 40.6	56.4	178 45.9	09.1	244 47.5	30.7																
	18	236 50.5	99 34.2	N 7 58.3	61 41.6	N 2 55.7	193 48.2	N15 09.1	259 50.2	S11 30.8	Kochab	137 19.9	N74 03.8													
	19	251 53.0	114 38.1	58.7	76 42.6	55.1	208 50.5	09.1	274 52.8	30.9	Markab	13 30.7	N15 20.0													
	20	266 55.5	129 41.9	59.0	91 43.7	54.4	223 52.8	09.2	289 55.5	30.9	Menkar	314 07.3	N 4 11.0													
	21	281 57.9	144 45.8	59.3	106 44.7	53.8	238 55.2	09.2	304 58.1	31.0	Menkent	147 59.1	S36 29.2													
	22	297 00.4	159 49.6	7 59.7	121 45.7	53.1	253 57.5	09.2	320 00.7	31.1	Miaplacidus	221 39.5	S69 48.7													
	23	312 02.8	174 53.4	8 00.0	136 46.7	52.5	268 59.8	09.3	335 03.4	31.1																
S A T U R D A Y	19 00	327 05.3	189 57.3	N 8 00.4	151 47.7	N 2 51.8	284 02.1	N15 09.3	350 06.0	S11 31.2	Mirfak	308 29.9	N49 56.5													
	01	342 07.8	205 01.1	00.7	166 48.7	51.2	299 04.5	09.3	5 08.7	31.3	Nunki	75 48.9	S26 16.1													
	02	357 10.2	220 04.9	01.1	181 49.7	50.5	314 06.8	09.4	20 11.3	31.4	Peacock	53 07.0	S56 39.6													
	03	12 12.7	235 08.8	01.4	196 50.8	49.9	329 09.1	09.4	35 13.9	31.4	Pollux	243 19.0	N27 58.2													
	04	27 15.2	250 12.6	01.7	211 51.8	49.2	344 11.5	09.4	50 16.6	31.5	Procyon	244 52.3	N 5 10.0													
	05	42 17.6	265 16.4	02.1	226 52.8	48.6	359 13.8	09.5	65 19.2	31.6																
	06	57 20.1	280 20.2	N 8 02.4	241 53.8	N 2 47.9	14 16.1	N15 09.5	80 21.8	S11 31.7	Rasalhague	95 59.4	N12 32.7													
	07	72 22.6	295 24.0	02.8	256 54.8	47.3	29 18.5	09.5	95 24.5	31.7	Regulus	207 36.0	N11 51.3													
	08	87 25.0	310 27.9	03.1	271 55.8	46.6	44 20.8	09.5	110 27.1	31.8	Rigel	281 05.1	S 8 10.3													
	09	102 27.5	325 31.7	03.5	286 56.8	46.0	59 23.1	09.6	125 29.8	31.9	Rigel Kent.	139 42.1	S60 56.1													
	10	117 29.9	340 35.5	03.8	301 57.9	45.3	74 25.4	09.6	140 32.4	31.9	Sabik	102 04.0	S15 45.2													
	11	132 32.4	355 39.3	04.2	316 58.9	44.7	89 27.8	09.6	155 35.0	32.0																
	12	147 34.9	10 43.1	N 8 04.5	331 59.9	N 2 44.0	104 30.1	N15 09.7	170 37.7	S11 32.1	Schedar	349 32.0	N56 39.8													
	13	162 37.3	25 46.9	04.9	347 00.9	43.4	119 32.4	09.7	185 40.3	32.2	Shaula	96 11.7	S37 07.3													
	14	177 39.8	40 50.7	05.2	2 01.9	42.7	134 34.8	09.7	200 43.0	32.2	Sirius	258 27.5	S16 44.7													
	15	192 42.3	55 54.5	05.6	17 02.9	42.0	149 37.1	09.8	215 45.6	32.3	Spica	158 23.7	S11 17.0													
	16	207 44.7	70 58.3	05.9	32 03.9	41.4	164 39.4	09.8	230 48.2	32.4	Suhail	222 47.6	S43 31.5													
	17	222 47.2	86 02.1	06.3	47 05.0	40.7	179 41.8	09.8	245 50.9	32.4																
	18	237 49.7	101 05.9	N 8 06.7	62 06.0	N 2 40.1	194 44.1	N15 09.8	260 53.5	S11 32.5	Vega	80 33.7	N38 48.5													
	19	252 52.1	116 09.7	07.0	77 07.0	39.4	209 46.4	09.9	275 56.2	32.6	Zuben'ubi	136 57.4	S16 08.4													
	20	267 54.6	131 13.4	07.4	92 08.0	38.8	224 48.8	09.9	290 58.8	32.7																
	21	282 57.1	146 17.2	07.7	107 09.0	38.1	239 51.1	09.9	306 01.4	32.7																
	22	297 59.5	161 21.0	08.1	122 10.0	37.5	254 53.5	10.0	321 04.1	32.8																
	23	313 02.0	176 24.8	08.4	137 11.0	36.8	269 55.8	10.0	336 06.7	32.9																
Mer.Pass. 2 15.2															v 3.9 d 0.3			v 1.0 d 0.6			v 2.3 d 0.0			v 2.6 d 0.1		
															SHA			Mer.Pass.								
															° / ' / "			h m								
															Venus			222 18.4			11 23					
															Mars			185 17.2			13 54					
															Jupiter			317 00.2			5 07					
															Saturn			22 56.5			0 44					

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise									
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	17	18	19	20					
	°	'		°	'									°	'	h	m	h	m	h	m	h
17 T H U R S D A Y	d	h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m		
	00	178	56.3	N13	34.0	171	07.8	15.5	N15	16.5	12.0	53.9	N 72	02 42	03 09	05 28	07 29	09 26				
	01	193	56.4		33.2	185	42.3	15.5		15	04.5	12.0	53.9	N 70	02 31	04 05	05 54	07 37	09 18			
	02	208	56.6		32.4	200	16.8	15.5		14	52.5	12.1	53.9	68	02 35	04 23	06 04	07 40	09 15			
	03	223	56.7		31.6	214	51.3	15.6		14	40.4	12.1	53.9	66	02 58	04 38	06 12	07 42	09 13			
	04	238	56.8		30.8	229	25.9	15.7		14	28.3	12.2	53.9	64	01 49	03 16	04 11	04 50	06 18	07 44	09 10	
	05	253	57.0		30.0	244	00.6	15.7		14	16.1	12.2	53.9	62	02 18	03 30	04 21	05 00	06 24	07 46	09 08	
	06	268	57.1	N13	29.2	258	35.3	15.7	N14	03.9	12.3	53.9	N 58	02 39	03 43	04 29	05 09	06 29	07 48	09 07		
	07	283	57.2		28.4	273	10.0	15.8		13	51.6	12.3	54.0	56	02 57	03 53	04 36	05 17	06 34	07 49	09 05	
	08	298	57.4		27.6	287	44.8	15.9		13	39.3	12.4	54.0	54	03 11	04 03	04 43	05 24	06 38	07 51	09 04	
	09	313	57.5		26.8	302	19.7	15.8		13	26.9	12.5	54.0	52	03 23	04 11	04 48	05 30	06 41	07 52	09 03	
	10	328	57.6		26.0	316	54.5	16.0		13	14.4	12.5	54.0	50	03 33	04 18	04 54	05 36	06 45	07 53	09 02	
	11	343	57.7		25.2	331	29.5	15.9		13	01.9	12.5	54.0	45	03 54	04 33	05 05	05 48	06 52	07 55	08 59	
	12	358	57.9	N13	24.4	346	04.4	16.1	N12	49.4	12.6	54.0	N 40	04 10	04 45	05 14	05 57	06 58	07 57	08 57		
	13	13	58.0		23.6	0	39.5	16.0		12	36.8	12.7	54.0	35	04 23	04 55	05 22	06 06	07 03	07 59	08 56	
	14	28	58.1		22.8	15	14.5	16.1		12	24.1	12.7	54.0	30	04 34	05 04	05 29	06 13	07 07	08 01	08 54	
	15	43	58.3		22.0	29	49.6	16.2		12	11.4	12.7	54.0	20	04 51	05 18	05 41	06 26	07 15	08 03	08 52	
	16	58	58.4		21.2	44	24.8	16.1		11	58.7	12.8	54.0	N 10	05 04	05 29	05 51	06 37	07 22	08 06	08 49	
	17	73	58.6		20.4	58	59.9	16.3		11	45.9	12.9	54.0	0	05 15	05 39	06 01	06 47	07 28	08 08	08 47	
	18	88	58.7	N13	19.6	73	35.2	16.2	N11	33.0	12.8	54.0	S 10	05 24	05 48	06 10	06 58	07 34	08 10	08 45		
	19	103	58.8		18.8	88	10.4	16.3		11	20.2	13.0	54.0	20	05 31	05 57	06 20	07 09	07 41	08 12	08 43	
	20	118	59.0		18.0	102	45.7	16.3		11	07.2	12.9	54.0	30	05 38	06 07	06 31	07 21	07 49	08 15	08 41	
	21	133	59.1		17.2	117	21.0	16.4		10	54.3	13.0	54.0	35	05 42	06 11	06 37	07 28	07 53	08 16	08 39	
	22	148	59.2		16.4	131	56.4	16.4		10	41.3	13.1	54.0	40	05 45	06 17	06 45	07 36	07 58	08 18	08 38	
	23	163	59.4		15.6	146	31.8	16.4		10	28.2	13.1	54.0	45	05 48	06 23	06 53	07 46	08 03	08 20	08 36	
18 F R I D A Y	00	178	59.5	N13	14.8	161	07.2	16.5	N10	15.1	13.1	54.0	S 50	05 52	06 30	07 03	07 57	08 10	08 22	08 34		
	01	193	59.6		14.0	175	42.7	16.5		10	02.0	13.2	54.0	52	05 53	06 33	07 08	08 02	08 13	08 23	08 33	
	02	208	59.8		13.2	190	18.2	16.5		9	48.8	13.2	54.0	54	05 55	06 36	07 13	08 08	08 17	08 24	08 32	
	03	223	59.9		12.4	204	53.7	16.6		9	35.6	13.2	54.0	56	05 56	06 40	07 19	08 14	08 20	08 26	08 31	
	04	239	00.0		11.6	219	29.3	16.6		9	22.4	13.3	54.1	58	05 57	06 43	07 25	08 21	08 25	08 27	08 29	
	05	254	00.2		10.8	234	04.9	16.6		9	09.1	13.3	54.1	S 60	05 59	06 48	07 32	08 29	08 29	08 29	08 28	
	06	269	00.3	N13	10.0	248	40.5	16.7	N 8	55.8	13.3	54.1	Lat.	Sunset	Twilight		Moonset					
	07	284	00.5		09.2	263	16.2	16.6		8	42.5	13.4			54.1	Civil	Naut.	17	18	19	20	
	08	299	00.6		08.4	277	51.8	16.7		8	29.1	13.4	54.1	°	h	m	h	m	h	m	h	m
	09	314	00.7		07.6	292	27.5	16.8		8	15.7	13.5	54.1									
	10	329	00.9		06.8	307	03.3	16.7		8	02.2	13.5	54.1	N 70	20 54	22 47	23 57	21 17	20 50	20 27	20 03	
	11	344	01.0		06.0	321	39.0	16.8		7	48.7	13.5	54.1	68	20 34	21 59	23 57	21 03	20 44	20 27	20 09	
	12	359	01.1	N13	05.1	336	14.8	16.8	N 7	35.2	13.5	54.1	66	20 18	21 29	23 57	20 52	20 39	20 27	20 14		
	13	14	01.3		04.3	350	50.6	16.8		7	21.7	13.6	54.1	64	20 06	21 07	22 57	20 43	20 35	20 27	20 19	
	14	29	01.4		03.5	5	26.4	16.8		7	08.1	13.6	54.1	62	19 55	20 50	22 14	20 35	20 31	20 27	20 23	
	15	44	01.6		02.7	20	02.2	16.9		6	54.5	13.6	54.1	60	19 46	20 35	21 46	20 28	20 27	20 27	20 26	
	16	59	01.7		01.9	34	38.1	16.9		6	40.9	13.7	54.1	N 58	19 37	20 23	21 26	20 22	20 24	20 27	20 29	
	17	74	01.8		01.1	49	14.0	16.9		6	27.2	13.7	54.1	56	19 30	20 13	21 09	20 16	20 22	20 27	20 32	
	18	89	02.0	N13	00.3	63	49.9	16.9	N 6	13.5	13.7	54.2	54	19 24	20 04	20 55	20 11	20 19	20 27	20 34		
	19	104	02.1		59.5	78	25.8	16.9		5	59.8	13.7	54.2	52	19 18	19 56	20 43	20 07	20 17	20 27	20 37	
	20	119	02.3		58.7	93	01.7	16.9		5	46.1	13.8	54.2	50	19 13	19 49	20 33	20 03	20 15	20 27	20 39	
	21	134	02.4		57.9	107	37.6	17.0		5	32.3	13.8	54.2	45	19 02	19 34	20 12	19 54	20 11	20 27	20 43	
	22	149	02.5		57.1	122	13.6	16.9		5	18.5	13.8	54.2	N 40	18 53	19 22	19 56	19 46	20 07	20 27	20 47	
	23	164	02.7		56.2	136	49.5	17.0		5	04.7	13.8	54.2	35	18 45	19 12	19 44	19 40	20 04	20 27	20 50	
	19 S A T U R D A Y	00	179	02.8	N12	55.4	151	25.5	17.0	N 4	50.9	13.9	54.2	30	18 38	19 03	19 33	19 34	20 01	20 27	20 53	
01		194	03.0		54.6	166	01.5	17.0		4	37.0	13.8	54.2	20	18 27	18 50	19 16	19 24	19 56	20 27	20 58	
02		209	03.1		53.8	180	37.5	17.0		4	23.2	13.9	54.2	N 10	18 17	18 38	19 04	19 15	19 51	20 27	21 02	
03		224	03.2		53.0	195	13.5	17.0		4	09.3	13.9	54.2	0	18 07	18 29	18 53	19 07	19 47	20 27	21 06	
04		239	03.4		52.2	209	49.5	17.0		3	55.4	14.0	54.3	S 10	17 58	18 20	18 44	18 59	19 43	20 27	21 11	
05		254	03.5		51.4	224	25.5	17.0		3	41.4	13.9	54.3	20	17 48	18 11	18 37	18 50	19 38	20 26	21 15	
06		269	03.7	N12	50.6	239	01.5	17.1	N 3	27.5	14.0	54.3	30	17 37	18 02	18 30	18 40	19 33	20 26	21 20		
07		284	03.8		49.7	253	37.6	17.0		3	13.5	14.0	54.3	35	17 31	17 57	18 27	18 34	19 30	20 26	21 23	
08		299	04.0		48.9	268	13.6	17.0		2	59.5	14.0	54.3	40	17 24	17 52	18 23	18 27	19 27	20 26	21 27	
09		314	04.1		48.1	282	49.6	17.1		2	45.5	14.0	54.3	45	17 15	17 46	18 20	18 19	19 23	20 26	21 30	
10		329	04.2		47.3	297	25.7	17.0		2	31.5	14.0	54.3	S 50	17 05	17 39	18 17	18 09	19 18	20 26	21 35	
11		344	04.4		46.5	312	01.7	17.														

UT		ARIES			VENUS -4.1			MARS +1.8			JUPITER -2.5			SATURN +0.4			STARS		
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
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UT	SUN			MOON							Lat.	Twilight		Sunrise	Moonrise					
										Naut.		Civil	20		21	22	23			
	GHA	Dec	GHA	v	Dec	d	HP	h	m									h	m	h
SUNDAY	d	h	°	°	°	°	°	°	°	°	°	h	m	h	m	h	m	h	m	
	00	179	06.3	N12 35.8	141	49.7	16.9	S	0	45.8	14.1	54.5	N 72	////	////	03 01	09 26	11 30	14 01	
	01	194	06.4		156	25.6	16.9		0	59.9	14.2	54.5	N 70	////	01 42	03 25	09 22	11 15	13 25	
	02	209	06.6		171	01.5	16.9		1	14.1	14.2	54.5	68	////	02 22	03 43	09 18	11 03	13 00	15 27
	03	224	06.7	33.4	185	37.4	16.9		1	28.3	14.1	54.5	66	////	02 49	03 57	09 15	10 54	12 40	14 44
	04	239	06.9		200	13.3	16.9		1	42.4	14.2	54.6	64	01 29	03 09	04 09	09 13	10 46	12 25	14 15
	05	254	07.0		214	49.2	16.8		1	56.6	14.1	54.6	62	02 06	03 26	04 19	09 10	10 39	12 12	13 54
	06	269	07.2	N12 30.9	229	25.0	16.8	S	2	10.7	14.2	54.6	60	02 30	03 39	04 28	09 08	10 33	12 01	13 36
	07	284	07.3		244	00.8	16.8		2	24.9	14.1	54.6	N 58	02 50	03 50	04 35	09 07	10 27	11 52	13 22
	08	299	07.4		258	36.6	16.8		2	39.0	14.2	54.6	56	03 05	04 00	04 42	09 05	10 23	11 44	13 09
	09	314	07.6	28.5	273	12.4	16.7		2	53.2	14.1	54.6	54	03 18	04 09	04 48	09 04	10 19	11 37	12 59
	10	329	07.7		287	48.1	16.7		3	07.3	14.2	54.7	52	03 29	04 16	04 53	09 03	10 15	11 30	12 49
	11	344	07.9		302	23.8	16.7		3	21.5	14.1	54.7	50	03 39	04 23	04 58	09 02	10 12	11 24	12 41
	12	359	08.0	N12 26.0	316	59.5	16.7	S	3	35.6	14.1	54.7	45	03 59	04 37	05 08	08 59	10 04	11 12	12 23
	13	14	08.2		331	35.2	16.6		3	49.7	14.2	54.7	N 40	04 14	04 48	05 17	08 57	09 58	11 02	12 08
	14	29	08.3		346	10.8	16.6		4	03.9	14.1	54.7	35	04 26	04 58	05 24	08 56	09 53	10 53	11 56
	15	44	08.5	23.5	0	46.4	16.6		4	18.0	14.1	54.7	30	04 36	05 06	05 31	08 54	09 49	10 46	11 45
	16	59	08.6		15	22.0	16.6		4	32.1	14.1	54.8	20	04 52	05 19	05 42	08 52	09 41	10 32	11 27
	17	74	08.8		29	57.6	16.5		4	46.2	14.1	54.8	N 10	05 04	05 30	05 51	08 49	09 34	10 21	11 11
	18	89	08.9	N12 21.0	44	33.1	16.4	S	5	00.3	14.1	54.8	0	05 14	05 39	06 00	08 47	09 28	10 11	10 57
	19	104	09.1		59	08.5	16.5		5	14.4	14.1	54.8	S 10	05 22	05 47	06 09	08 45	09 22	10 00	10 42
	20	119	09.2		73	44.0	16.4		5	28.5	14.0	54.8	20	05 29	05 55	06 18	08 43	09 15	09 49	10 27
	21	134	09.4	18.5	88	19.4	16.4		5	42.5	14.1	54.9	30	05 36	06 04	06 28	08 41	09 07	09 36	10 09
	22	149	09.5		102	54.8	16.3		5	56.6	14.0	54.9	35	05 38	06 08	06 34	08 39	09 03	09 29	09 59
	23	164	09.7		117	30.1	16.3		6	10.6	14.0	54.9	40	05 41	06 13	06 40	08 38	08 58	09 21	09 48
MONDAY	00	179	09.8	N12 16.1	132	05.4	16.2	S	6	24.6	14.1	54.9	45	05 44	06 18	06 48	08 36	08 53	09 12	09 34
	01	194	10.0		146	40.6	16.2		6	38.7	14.0	54.9	S 50	05 46	06 24	06 57	08 34	08 46	09 00	09 18
	02	209	10.1		161	15.8	16.2		6	52.7	13.9	54.9	52	05 47	06 27	07 02	08 33	08 43	08 55	09 10
	03	224	10.3	13.6	175	51.0	16.1		7	06.6	14.0	55.0	54	05 48	06 30	07 06	08 32	08 40	08 49	09 01
	04	239	10.5		190	26.1	16.0		7	20.6	13.9	55.0	56	05 49	06 33	07 11	08 31	08 36	08 43	08 52
	05	254	10.6		205	01.1	16.1		7	34.5	13.9	55.0	58	05 51	06 36	07 17	08 29	08 32	08 36	08 41
	06	269	10.8	N12 11.1	219	36.2	15.9	S	7	48.4	13.9	55.0	S 60	05 52	06 40	07 24	08 28	08 27	08 28	08 29
	07	284	10.9		234	11.1	15.9		8	02.3	13.9	55.0	Lat.		Twilight		Moonset			
	08	299	11.1		248	46.0	15.9		8	16.2	13.9	55.1	Sunset		Civil	Naut.	20	21	22	23
	09	314	11.2	08.6	263	20.9	15.8		8	30.1	13.8	55.1					h m	h m	h m	h m
	10	329	11.4		277	55.7	15.8		8	43.9	13.8	55.1	N 72	21 01	23 44	////	19 55	19 18	18 17	
	11	344	11.5		292	30.5	15.7		8	57.7	13.8	55.1	N 70	20 38	22 17	////	20 03	19 35	18 56	
	12	359	11.7	N12 06.1	307	05.2	15.6	S	9	11.5	13.8	55.2	68	20 21	21 39	////	20 09	19 49	19 23	18 33
	13	14	11.8		321	39.8	15.6		9	25.3	13.7	55.2	66	20 21	21 39	////	20 09	19 49	19 23	18 33
	14	29	12.0		336	14.4	15.6		9	39.0	13.7	55.2	64	20 07	21 14	23 46	20 14	20 00	19 43	19 17
	15	44	12.1	03.6	350	49.0	15.5		9	52.7	13.7	55.2	62	19 55	20 54	22 30	20 19	20 10	20 00	19 47
	16	59	12.3		5	23.5	15.4		10	06.4	13.7	55.2	60	19 45	20 38	21 56	20 23	20 18	20 14	20 09
	17	74	12.4		19	57.9	15.3		10	20.1	13.6	55.3	58	19 37	20 25	21 33	20 26	20 26	20 26	20 28
	18	89	12.6	N12 01.1	34	32.2	15.3	S10	33.7	13.6	55.3	N 58	19 30	20 14	21 14	20 29	20 32	20 36	20 43	20 43
	19	104	12.8	12 00.3	49	06.5	15.2		10	47.3	13.5	55.3	56	19 23	20 05	20 59	20 32	20 38	20 45	20 56
	20	119	12.9	11 59.4	63	40.7	15.2		11	00.8	13.6	55.3	54	19 17	19 56	20 46	20 34	20 43	20 53	21 07
	21	134	13.1	58.6	78	14.9	15.1		11	14.4	13.4	55.4	52	19 12	19 49	20 35	20 37	20 47	21 00	21 17
	22	149	13.2		92	49.0	15.0		11	27.8	13.5	55.4	50	19 07	19 42	20 26	20 39	20 51	21 07	21 27
	23	164	13.4		107	23.0	15.0		11	41.3	13.4	55.4	45	18 57	19 28	20 07	20 43	21 01	21 21	21 46
	TUESDAY	00	179	13.5	N11 56.1	121	57.0	14.9	S11	54.7	13.4	55.4	N 40	18 49	19 17	19 52	20 47	21 08	21 32	22 02
01		194	13.7		136	30.9	14.8		12	08.1	13.3	55.5	35	18 42	19 08	19 40	20 50	21 15	21 42	22 15
02		209	13.8		151	04.7	14.8		12	21.4	13.4	55.5	30	18 35	19 00	19 30	20 53	21 21	21 51	22 27
03		224	14.0	53.6	165	38.5	14.6		12	34.8	13.2	55.5	20	18 25	18 47	19 14	20 58	21 31	22 06	22 47
04		239	14.2		180	12.1	14.6		12	48.0	13.3	55.5	N 10	18 15	18 37	19 02	21 02	21 40	22 20	23 04
05		254	14.3		194	45.7	14.6		13	01.3	13.1	55.6	0	18 07	18 28	18 52	21 06	21 48	22 32	23 21
06		269	14.5	N11 51.1	209	19.3	14.4	S13	14.4	13.2	55.6	S 10	17 58	18 19	18 44	21 11	21 56	22 45	23 37	
07		284	14.6		223	52.7	14.4		13	27.6	13.1	55.6	20	17 49	18 11	18 37	21 15	22 05	22 58	23 55
08		299	14.8		238	26.1	14.3		13	40.7	13.0	55.6	30	17 39	18 03	18 31	21 20	22 16	23 14	24 15
09		314	15.0	48.5	252	59.4	14.2		13	53.7	13.0	55.7	35	17 33	17 59	18 29	21 23	22 22	23 23	24 27
10		329	15.1		267	32.6	14.1		14	06.7	13.0	55.7	40	17 26	17 54	18 26	21 27	22 29	23 33	24 41
11		344	15.3		282	05.7	14.0		14	19.7	12.9	55.7	45	17 19	17 49	18 23	21 30	22 37	23 46	24 58
12		359	15.4	N11 46.0	296	38.7	14.0	S14	32.6	12.9	55.7	S 50	17 10	17 43	18 21	21 35	22 46	24 00	00 00	
13		14	15.6		311	11.7	13.9		14	45.5	12.8	55.8	52	17 06	17 40	18 20	21 37	22 51	24 07	00 07
14		29																		

2023 AUGUST 23, 24, 25 (WED., THURS., FRI.)															
UT	ARIES		VENUS -4.3		MARS +1.8		JUPITER -2.5		SATURN +0.4		STARS				
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec			
WEDNESDAY	23 00	331 01.9	195 52.5 N 8 35.8	153 24.9 N 1 49.2	287 47.2 N15 11.9	354 19.5 S11 38.1	Acamar	315 12.5 S40 12.3							
	01	346 04.3	210 56.0 36.2	168 25.9 48.5	302 49.5 11.9	9 22.2 38.2	Achernar	335 20.7 S57 06.7							
	02	1 06.8	225 59.6 36.5	183 26.9 47.9	317 51.9 11.9	24 24.8 38.3	Acrux	173 01.9 S63 13.9							
	03	16 09.3	241 03.1 . . 36.9	198 28.0 . . 47.2	332 54.3 . . 11.9	39 27.4 . . 38.4	Adhara	255 07.0 S29 00.0							
	04	31 11.7	256 06.7 37.3	213 29.0 46.6	347 56.6 11.9	54 30.1 38.4	Aldebaran	290 41.0 N16 33.4							
	05	46 14.2	271 10.2 37.7	228 30.0 45.9	2 59.0 12.0	69 32.7 38.5									
	06	61 16.6	286 13.7 N 8 38.1	243 31.0 N 1 45.3	18 01.3 N15 12.0	84 35.4 S11 38.6	Alioth	166 14.4 N55 50.2							
	07	76 19.1	301 17.3 38.5	258 32.0 44.6	33 03.7 12.0	99 38.0 38.6	Alkaid	152 53.2 N49 12.0							
	08	91 21.6	316 20.8 38.9	273 33.0 44.0	48 06.1 12.0	114 40.6 38.7	Alnair	27 33.9 S46 50.7							
	09	106 24.0	331 24.3 . . 39.3	288 34.0 . . 43.3	63 08.4 . . 12.0	129 43.3 . . 38.8	Alnilam	275 39.0 S 1 11.1							
	10	121 26.5	346 27.8 39.6	303 35.0 42.6	78 10.8 12.1	144 45.9 38.9	Alphard	217 49.2 S 8 45.5							
	11	136 29.0	1 31.3 40.0	318 36.0 42.0	93 13.1 12.1	159 48.6 38.9									
	12	151 31.4	16 34.8 N 8 40.4	333 37.0 N 1 41.3	108 15.5 N15 12.1	174 51.2 S11 39.0	Alphecca	126 04.7 N26 38.3							
	13	166 33.9	31 38.3 40.8	348 38.1 40.7	123 17.9 12.1	189 53.9 39.1	Alpheratz	357 35.7 N29 13.2							
	14	181 36.4	46 41.8 41.2	3 39.1 40.0	138 20.2 12.2	204 56.5 39.2	Altair	62 00.8 N 8 55.9							
	15	196 38.8	61 45.3 . . 41.6	18 40.1 . . 39.4	153 22.6 . . 12.2	219 59.1 . . 39.2	Ankaa	353 07.9 S42 10.5							
	16	211 41.3	76 48.8 42.0	33 41.1 38.7	168 25.0 12.2	235 01.8 39.3	Antares	112 17.2 S26 29.1							
	17	226 43.7	91 52.3 42.4	48 42.1 38.1	183 27.3 12.2	250 04.4 39.4									
	18	241 46.2	106 55.8 N 8 42.8	63 43.1 N 1 37.4	198 29.7 N15 12.2	265 07.1 S11 39.4	Arcturus	145 49.1 N19 03.8							
	19	256 48.7	121 59.3 43.2	78 44.1 36.7	213 32.1 12.3	280 09.7 39.5	Atria	107 12.3 S69 04.4							
	20	271 51.1	137 02.8 43.6	93 45.1 36.1	228 34.4 12.3	295 12.3 39.6	Avior	234 15.8 S59 34.9							
	21	286 53.6	152 06.3 . . 43.9	108 46.1 . . 35.4	243 36.8 . . 12.3	310 15.0 . . 39.7	Bellatrix	278 24.2 N 6 22.4							
	22	301 56.1	167 09.7 44.3	123 47.1 34.8	258 39.2 12.3	325 17.6 39.7	Betelgeuse	270 53.5 N 7 24.8							
23	316 58.5	182 13.2 44.7	138 48.1 34.1	273 41.5 12.3	340 20.3 39.8										
THURSDAY	24 00	332 01.0	197 16.7 N 8 45.1	153 49.2 N 1 33.5	288 43.9 N15 12.4	355 22.9 S11 39.9	Canopus	263 53.2 S52 42.1							
	01	347 03.5	212 20.1 45.5	168 50.2 32.8	303 46.3 12.4	10 25.6 39.9	Capella	280 23.7 N46 01.2							
	02	2 05.9	227 23.6 45.9	183 51.2 32.2	318 48.6 12.4	25 28.2 40.0	Deneb	49 26.2 N45 22.0							
	03	17 08.4	242 27.1 . . 46.3	198 52.2 . . 31.5	333 51.0 . . 12.4	40 30.8 . . 40.1	Denebola	182 26.4 N14 26.6							
	04	32 10.9	257 30.5 46.7	213 53.2 30.8	348 53.4 12.4	55 33.5 40.2	Diphda	348 48.2 S17 51.3							
	05	47 13.3	272 34.0 47.1	228 54.2 30.2	3 55.7 12.4	70 36.1 40.2									
	06	62 15.8	287 37.4 N 8 47.5	243 55.2 N 1 29.5	18 58.1 N15 12.5	85 38.8 S11 40.3	Dubhe	193 43.0 N61 37.6							
	07	77 18.2	302 40.8 47.9	258 56.2 28.9	34 00.5 12.5	100 41.4 40.4	Elnath	278 03.5 N28 37.6							
	08	92 20.7	317 44.3 48.3	273 57.2 28.2	49 02.9 12.5	115 44.1 40.4	Eltanin	90 42.5 N51 29.4							
	09	107 23.2	332 47.7 . . 48.6	288 58.2 . . 27.6	64 05.2 . . 12.5	130 46.7 . . 40.5	Enif	33 39.6 N 9 59.1							
	10	122 25.6	347 51.1 49.0	303 59.2 26.9	79 07.6 12.5	145 49.3 40.6	Fomalhaut	15 15.4 S29 29.7							
	11	137 28.1	2 54.6 49.4	319 00.2 26.3	94 10.0 12.6	160 52.0 40.7									
	12	152 30.6	17 58.0 N 8 49.8	334 01.3 N 1 25.6	109 12.3 N15 12.6	175 54.6 S11 40.7	Gacrux	171 53.4 S57 14.8							
	13	167 33.0	33 01.4 50.2	349 02.3 24.9	124 14.7 12.6	190 57.3 40.8	Gienah	175 45.0 S17 40.3							
	14	182 35.5	48 04.8 50.6	4 03.3 24.3	139 17.1 12.6	205 59.9 40.9	Hadar	148 38.0 S60 29.4							
	15	197 38.0	63 08.2 . . 51.0	19 04.3 . . 23.6	154 19.5 . . 12.6	221 02.6 . . 41.0	Hamal	327 52.3 N23 34.4							
	16	212 40.4	78 11.6 51.4	34 05.3 23.0	169 21.8 12.7	236 05.2 41.0	Kaus Aust.	83 33.8 S34 22.5							
	17	227 42.9	93 15.0 51.8	49 06.3 22.3	184 24.2 12.7	251 07.8 41.1									
	18	242 45.4	108 18.4 N 8 52.2	64 07.3 N 1 21.7	199 26.6 N15 12.7	266 10.5 S11 41.2	Kochab	137 20.1 N74 03.8							
	19	257 47.8	123 21.8 52.6	79 08.3 21.0	214 28.9 12.7	281 13.1 41.2	Markab	13 30.7 N15 20.0							
	20	272 50.3	138 25.2 53.0	94 09.3 20.4	229 31.3 12.7	296 15.8 41.3	Menkar	314 07.3 N 4 11.0							
	21	287 52.7	153 28.6 . . 53.4	109 10.3 . . 19.7	244 33.7 . . 12.7	311 18.4 . . 41.4	Menkent	147 59.2 S36 29.2							
	22	302 55.2	168 32.0 53.8	124 11.3 19.0	259 36.1 12.8	326 21.1 41.5	Miaplacidus	221 39.5 S69 48.7							
23	317 57.7	183 35.4 54.2	139 12.3 18.4	274 38.4 12.8	341 23.7 41.5										
FRIDAY	25 00	333 00.1	198 38.8 N 8 54.6	154 13.4 N 1 17.7	289 40.8 N15 12.8	356 26.3 S11 41.6	Mirfak	308 29.8 N49 56.5							
	01	348 02.6	213 42.1 54.9	169 14.4 17.1	304 43.2 12.8	11 29.0 41.7	Nunki	75 48.9 S26 16.1							
	02	3 05.1	228 45.5 55.3	184 15.4 16.4	319 45.6 12.8	26 31.6 41.7	Peacock	53 07.0 S56 39.6							
	03	18 07.5	243 48.9 . . 55.7	199 16.4 . . 15.8	334 47.9 . . 12.8	41 34.3 . . 41.8	Pollux	243 19.0 N27 58.2							
	04	33 10.0	258 52.2 56.1	214 17.4 15.1	349 50.3 12.9	56 36.9 41.9	Procyon	244 52.3 N 5 10.0							
	05	48 12.5	273 55.6 56.5	229 18.4 14.5	4 52.7 12.9	71 39.5 42.0									
	06	63 14.9	288 58.9 N 8 56.9	244 19.4 N 1 13.8	19 55.1 N15 12.9	86 42.2 S11 42.0	Rasalhague	95 59.5 N12 32.7							
	07	78 17.4	304 02.3 57.3	259 20.4 13.1	34 57.5 12.9	101 44.8 42.1	Regulus	207 36.0 N11 51.3							
	08	93 19.9	319 05.6 57.7	274 21.4 12.5	49 59.8 12.9	116 47.5 42.2	Rigel	281 05.1 S 8 10.3							
	09	108 22.3	334 09.0 . . 58.1	289 22.4 . . 11.8	65 02.2 . . 12.9	131 50.1 . . 42.2	Rigel Kent.	139 42.1 S60 56.1							
	10	123 24.8	349 12.3 58.5	304 23.4 11.2	80 04.6 13.0	146 52.8 42.3	Sabik	102 04.0 S15 45.2							
	11	138 27.2	4 15.7 58.9	319 24.4 10.5	95 07.0 13.0	161 55.4 42.4									
	12	153 29.7	19 19.0 N 8 59.3	334 25.4 N 1 09.9	110 09.3 N15 13.0	176 58.0 S11 42.5	Schedar	349 31.9 N56 39.9							
	13	168 32.2	34 22.3 8 59.7	349 26.4 09.2	125 11.7 13.0	192 00.7 42.5	Shaula	96 11.8 S37 07.3							
	14	183 34.6	49 25.6 9 00.1	4 27.5 08.5	140 14.1 13.0	207 03.3 42.6	Sirius	258 27.5 S16 44.7							
	15	198 37.1	64 29.0 . . 00.5	19 28.5 . . 07.9	155 16.5 . . 13.0	222 06.0 . . 42.7	Spica	158 23.7 S11 17.0							
	16	213 39.6	79 32.3 00.9	34 29.5 07.2	170 18.9 13.1	237 08.6 42.8	Suhail	222 47.6 S43 31.5							
	17	228 42.0	94 35.6 01.3	49 30.5 06.6	185 21.2 13.1	252 11.3 42.8									
	18	243 44.5	109 38.9 N 9 01.7	64 31.5 N 1 05.9	200 23.6 N15 13.1	267 13.9 S11 42.9	Vega	80 33.7 N38 48.5							
	19	258 47.0	124 42.2 02.1	79 32.5 05.3	215 26.0 13.1	282 16.5 43.0	Zuben'ubi	136 57.4 S16 08.4							
	20	273 49.4	139 45.5 02.4	94 33.5 04.6	230 28.4 13.1	297 19.2 43.0									
	21	288 51.9	154 48.8 . . 02.8	109 34.5 . . 03.9	245 30.8 . . 13.1	312 21.8 . . 43.1									
	22	303 54.3	169 52.1 03.2	124 35.5 03.3	260 33.2 13.2	327 24.5 43.2									
23	318 56.8	184 55.4 03.6	139 36.5 02.6	275 35.5 13.2	342 27.1 43.3										
Mer. Pass. 1 51.6 v 3.4 d 0.4 v 1.0 d 0.7 v 2.4 d 0.0 v 2.6 d 0.1															
											SHA			Mer. Pass	
											Venus			225 15.7 10 48	
											Mars			181 48.2 13 44	
											Jupiter			316 42.9 4 44	
											Saturn			23 21.9 0 18	

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise			
										Naut.	Civil		23	24	25	26
	GHA	Dec	GHA	v	Dec	d	HP	h m		h m	h m		h m	h m	h m	
WEDNESDAY	23 00	179 17.3	N11 35.9	111 08.4	12.8	S17 03.3	12.2	56.1	N 72	01 10	03 18	03 18	15 27	14 44	16 28	17 54
	01	194 17.5	35.1	125 40.2	12.8	17 15.5	12.1	56.1	N 70	02 07	03 39	03 39	15 27	14 44	16 28	17 54
	02	209 17.7	34.2	140 12.0	12.7	17 27.6	12.1	56.1	68	01 01	03 02	04 07	14 44	13 36	15 18	17 03
	03	224 17.8	33.4	154 43.7	12.6	17 39.7	11.9	56.2	64	01 51	03 21	04 18	14 15	13 36	15 18	17 03
	04	239 18.0	32.5	169 15.3	12.4	17 51.6	11.9	56.2	62	02 20	03 35	04 27	13 54	13 36	15 18	17 03
	05	254 18.2	31.7	183 46.7	12.4	18 03.5	11.9	56.2	60	02 42	03 47	04 35	13 36	13 36	15 18	17 03
	06	269 18.3	N11 30.9	198 18.1	12.2	S18 15.4	11.7	56.3	N 58	02 59	03 58	04 42	13 22	14 57	16 31	17 51
	07	284 18.5	30.0	212 49.3	12.2	18 27.1	11.7	56.3	56	03 13	04 07	04 48	13 09	14 39	16 07	17 24
	08	299 18.6	29.2	227 20.5	12.1	18 38.8	11.7	56.3	54	03 25	04 15	04 53	12 59	14 24	15 48	17 03
	09	314 18.8	28.3	241 51.6	11.9	18 50.5	11.5	56.3	52	03 36	04 22	04 58	12 49	14 11	15 32	16 45
	10	329 19.0	27.5	256 22.5	11.8	19 02.0	11.5	56.4	50	03 45	04 28	05 03	12 41	14 00	15 18	16 30
	11	344 19.1	26.6	270 53.3	11.8	19 13.5	11.3	56.4	45	04 03	04 41	05 12	12 23	13 36	14 50	15 59
	12	359 19.3	N11 25.8	285 24.1	11.6	S19 24.8	11.4	56.4	N 40	04 17	04 51	05 20	12 08	13 18	14 28	15 35
	13	14 19.5	24.9	299 54.7	11.5	19 36.2	11.2	56.5	35	04 29	05 00	05 27	11 56	13 02	14 10	15 16
	14	29 19.6	24.1	314 25.2	11.4	19 47.4	11.1	56.5	30	04 38	05 08	05 32	11 45	12 48	13 54	14 59
	15	44 19.8	23.2	328 55.6	11.3	19 58.5	11.1	56.5	20	04 53	05 20	05 42	11 27	12 26	13 27	14 31
	16	59 20.0	22.4	343 25.9	11.2	20 09.6	11.0	56.6	N 10	05 05	05 30	05 51	11 11	12 06	13 05	14 07
	17	74 20.1	21.5	357 56.1	11.0	20 20.6	10.9	56.6	0	05 14	05 38	05 59	10 57	11 48	12 44	13 44
	18	89 20.3	N11 20.7	12 26.1	11.0	S20 31.5	10.8	56.6	S 10	05 21	05 46	06 07	10 42	11 29	12 23	13 22
	19	104 20.4	19.8	26 56.1	10.8	20 42.3	10.7	56.7	20	05 27	05 53	06 15	10 27	11 10	12 00	12 58
	20	119 20.6	19.0	41 25.9	10.8	20 53.0	10.6	56.7	30	05 33	06 00	06 25	10 09	10 48	11 34	12 30
	21	134 20.8	18.1	55 55.7	10.6	21 03.6	10.5	56.7	35	05 35	06 04	06 30	09 59	10 35	11 19	12 13
	22	149 20.9	17.3	70 25.3	10.5	21 14.1	10.4	56.8	40	05 37	06 09	06 36	09 48	10 20	11 01	11 54
	23	164 21.1	16.4	84 54.8	10.3	21 24.5	10.4	56.8	45	05 39	06 13	06 43	09 34	10 03	10 40	11 31
THURSDAY	24 00	179 21.3	N11 15.6	99 24.1	10.3	S21 34.9	10.2	56.8	S 50	05 41	06 18	06 51	09 18	09 41	10 14	11 01
	01	194 21.4	14.7	113 53.4	10.1	21 45.1	10.2	56.9	52	05 42	06 21	06 55	09 10	09 31	10 01	10 46
	02	209 21.6	13.9	128 22.5	10.1	21 55.3	10.0	56.9	54	05 42	06 23	07 00	09 01	09 19	09 46	10 29
	03	224 21.8	13.0	142 51.6	9.9	22 05.3	9.9	56.9	56	05 43	06 26	07 04	08 52	09 06	09 29	10 09
	04	239 21.9	12.2	157 20.5	9.7	22 15.2	9.9	57.0	58	05 43	06 29	07 09	08 41	08 51	09 08	09 44
	05	254 22.1	11.3	171 49.2	9.7	22 25.1	9.7	57.0	S 60	05 44	06 32	07 15	08 29	08 33	08 43	09 09
	06	269 22.3	N11 10.5	186 17.9	9.5	S22 34.8	9.6	57.0	Lat.	Sunset	Twilight		Moonset			
	07	284 22.4	09.6	200 46.4	9.5	22 44.4	9.5	57.1			Civil	Naut.	23	24	25	26
	08	299 22.6	08.8	215 14.9	9.3	22 53.9	9.5	57.1					h m	h m	h m	h m
	09	314 22.8	07.9	229 43.2	9.1	23 03.4	9.2	57.1	N 72	20 43	22 42	22 42	18 33	19 17	19 55	20 47
	10	329 22.9	07.0	244 11.3	9.1	23 12.6	9.2	57.2	N 70	20 23	21 52	21 52	18 33	19 17	19 55	20 47
	11	344 23.1	06.2	258 39.4	8.9	23 21.8	9.1	57.2	68	20 08	21 21	21 21	18 33	19 17	19 55	20 47
	12	359 23.3	N11 05.3	273 07.3	8.8	S23 30.9	8.9	57.3	66	19 55	20 59	22 53	19 17	19 17	19 55	20 47
	13	14 23.4	04.5	287 35.1	8.7	23 39.8	8.9	57.3	64	19 45	20 42	22 09	19 47	19 21	19 55	20 47
	14	29 23.6	03.6	302 02.8	8.6	23 48.7	8.7	57.3	62	19 36	20 27	21 41	20 09	20 04	19 55	20 47
	15	44 23.8	02.8	316 30.4	8.5	23 57.4	8.6	57.4	60	19 28	20 15	21 20	20 09	20 04	19 55	20 47
	16	59 24.0	01.9	330 57.9	8.3	24 06.0	8.5	57.4	N 58	19 22	20 05	21 03	20 43	20 55	21 19	22 07
	17	74 24.1	01.1	345 25.2	8.2	24 14.5	8.3	57.4	56	19 16	19 57	20 49	20 56	21 13	21 43	22 34
	18	89 24.3	N11 00.2	359 52.4	8.1	S24 22.8	8.2	57.5	54	19 10	19 49	20 38	21 07	21 29	22 02	22 56
	19	104 24.5	10 59.3	14 19.5	7.9	24 31.0	8.1	57.5	52	19 06	19 42	20 28	21 17	21 42	22 19	23 13
	20	119 24.6	58.5	28 46.4	7.9	24 39.1	8.0	57.5	50	19 01	19 36	20 19	21 27	21 54	22 33	23 29
	21	134 24.8	57.6	43 13.3	7.7	24 47.1	7.8	57.6	45	18 52	19 23	20 01	21 46	22 18	23 01	23 59
	22	149 25.0	56.8	57 40.0	7.6	24 54.9	7.7	57.6	N 40	18 44	19 13	19 47	22 02	22 38	23 24	24 23
	23	164 25.1	55.9	72 06.6	7.4	25 02.6	7.6	57.7	35	18 38	19 04	19 35	22 15	22 54	23 43	24 42
FRIDAY	25 00	179 25.3	N10 55.1	86 33.0	7.4	S25 10.2	7.4	57.7	30	18 32	18 57	19 26	22 07	22 39	23 29	24 29
	01	194 25.5	54.2	100 59.4	7.2	25 17.6	7.3	57.7	20	18 22	18 45	19 11	22 47	23 33	24 26	00 26
	02	209 25.7	53.3	115 25.6	7.1	25 24.9	7.2	57.8	N 10	18 14	18 35	19 00	23 04	23 54	24 50	00 50
	03	224 25.8	52.5	129 51.7	7.0	25 32.1	7.0	57.8	0	18 06	18 27	18 51	23 21	24 14	25 01	01 12
	04	239 26.0	51.6	144 17.7	6.9	25 39.1	6.8	57.8	S 10	17 58	18 19	18 44	23 37	24 34	00 34	01 34
	05	254 26.2	50.8	158 43.6	6.7	25 45.9	6.8	57.9	20	17 50	18 12	18 38	23 55	24 55	00 55	01 58
	06	269 26.3	N10 49.9	173 09.3	6.7	S25 52.7	6.6	57.9	30	17 41	18 05	18 33	24 15	00 15	01 20	02 25
	07	284 26.5	49.0	187 35.0	6.5	25 59.3	6.4	58.0	35	17 35	18 01	18 31	24 27	00 27	01 34	02 41
	08	299 26.7	48.2	202 00.5	6.4	26 05.7	6.3	58.0	40	17 29	17 57	18 28	24 41	00 41	01 51	03 00
	09	314 26.9	47.3	216 25.9	6.3	26 12.0	6.1	58.0	45	17 22	17 52	18 27	24 58	00 58	02 11	03 23
	10	329 27.0	46.5	230 51.2	6.1	26 18.1	6.0	58.1	S 50	17 14	17 47	18 25	00 00	01 18	02 37	03 53
	11	344 27.2	45.6	245 16.3	6.1	26 24.1	5.8	58.1	52	17 10	17 45	18 24	00 07	01 28	02 50	04 07
	12	359 27.4	N10 44.7	259 41.4	5.9	S26 29.9	5.7	58.1	54	17 06	17 43	18 24	00 15	01 39	03 04	04 24
	13	14 27.5	43.9	274 06.3	5.9	26 35.6	5.5	58.2	56	17 02	17 40	18 23	00 24	01 51	03 21	04 44
	14	29 27.7	43.0	288 31.2	5.7	26 41.1	5.4	58.2	58	16 56	17 37	18 23	00 34	02 06	03 41	05 09
	15	44 27.9	42.1	302 55.9	5.6	26 46.5	5.2	58.3	S 60	16 51	17 34	18 22	00 46	02 23	04 06	05 44
	16	59 28.1	41.3	317 20.5	5.5	26 51.7	5.0	58.3	Day	Eqn. of Time	Mer.	Mer. Pass.	Age	Phase		
	17	74 28.2	40.4	331 45.0	5.4	26 56.7	4.9	58.3		00 ^h	12 ^h	Pass.	Upper	Lower	d	%
	18	89 28.4	N10 39.6	346 09.4	5.3	S27 01.6	4.7	58.4	23	02 51	02 43	12 03	17 09	04 44	07 41	
	19	104 28.6	38.7	0 33.7	5.2	27 06.3	4.5	58.4	24	02 35	02 27	12 02	18 01	05 34	08 51	
	20	119 28.8	37.8	14 57.9	5.1	27 10.8	4.4									

UT	ARIES	VENUS	−4.5	MARS	+1.8	JUPITER	−2.6	SATURN	+0.4	STARS			
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
d h	° /	°	° /	°	°	°	° /	°	° /		° /	° /	
SATURDAY	26 00	333 53.9	199 58.7	N 9 04.0	154 37.5	N 1 02.0	290 37.9	N15 13.2	357 29.8	S11 43.3	Acamar	315 12.5	S40 12.3
	01	349 01.7	215 01.9	04.4	169 38.5	01.3	305 40.3	13.2	12 32.4	43.4	Achernar	335 20.6	S57 06.7
	02	4 04.2	230 05.2	04.8	184 39.5	00.7	320 42.7	13.2	27 35.0	43.5	Acrux	173 01.9	S63 13.9
	03	19 06.7	245 08.5	05.2	199 40.5	1 00.0	335 45.1	13.2	42 37.7	43.5	Adhara	255 07.0	S29 00.0
	04	34 09.1	260 11.8	05.6	214 41.5	0 59.3	350 47.5	13.2	57 40.3	43.6	Aldebaran	290 41.0	N16 33.4
	05	49 11.6	275 15.0	06.0	229 42.6	58.7	5 49.8	13.3	72 43.0	43.7			
	06	64 14.1	290 18.3	N 9 06.4	244 43.6	N 0 58.0	20 52.2	N15 13.3	87 45.6	S11 43.8	Alioth	166 14.4	N55 50.2
	07	79 16.5	305 21.5	06.8	259 44.6	57.4	35 54.6	13.3	102 48.3	43.8	Alkaid	152 53.2	N49 12.0
	08	94 19.0	320 24.8	07.2	274 45.6	56.7	50 57.0	13.3	117 50.9	43.9	Alnair	27 33.9	S46 50.0
	09	109 21.5	335 28.0	07.6	289 46.6	56.1	65 59.4	13.3	132 53.5	44.0	Anilam	275 39.0	S 1 11.1
	10	124 23.9	350 31.3	08.0	304 47.6	55.4	81 01.8	13.3	147 56.2	44.0	Alphard	217 49.2	S 8 45.5
	11	139 26.4	5 34.5	08.4	319 48.6	54.7	96 04.2	13.3	162 58.8	44.1			
	12	154 28.8	20 37.8	N 9 08.8	334 49.6	N 0 54.1	111 06.6	N15 13.4	178 01.5	S11 44.2	Alphecca	126 04.7	N26 38.3
	13	169 31.3	35 41.0	09.1	349 50.6	53.4	126 08.9	13.4	193 04.1	44.3	Alpheratz	357 35.6	N29 13.2
	14	184 33.8	50 44.2	09.5	4 51.6	52.8	141 11.3	13.4	208 06.8	44.3	Altair	62 00.8	N 8 55.9
	15	199 36.2	65 47.4	09.9	19 52.6	52.1	156 13.7	13.4	223 09.4	44.4	Ankaa	353 07.9	S42 10.5
	16	214 38.7	80 50.7	10.3	34 53.6	51.5	171 16.1	13.4	238 12.0	44.5	Antares	112 17.2	S26 29.1
	17	229 41.2	95 53.9	10.7	49 54.6	50.8	186 18.5	13.4	253 14.7	44.5			
	18	244 43.6	110 57.1	N 9 11.1	64 55.6	N 0 50.1	201 20.9	N15 13.4	268 17.3	S11 44.6	Arcturus	145 49.1	N19 03.8
	19	259 46.1	126 00.3	11.5	79 56.6	49.5	216 23.3	13.5	283 20.0	44.7	Atria	107 12.3	S69 04.4
	20	274 48.6	141 03.5	11.9	94 57.6	48.8	231 25.7	13.5	298 22.6	44.8	Avior	234 15.8	S59 34.8
	21	289 51.0	156 06.7	12.3	109 58.6	48.2	246 28.1	13.5	313 25.3	44.8	Bellatrix	278 24.2	N 6 22.4
	22	304 53.5	171 09.9	12.7	124 59.6	47.5	261 30.4	13.5	328 27.9	44.9	Betelgeuse	270 53.5	N 7 24.8
23	319 56.0	186 13.1	13.1	140 00.6	46.9	276 32.8	13.5	343 30.5	45.0				
SUNDAY	27 00	334 58.4	201 16.3	N 9 13.5	155 01.7	N 0 46.2	291 35.2	N15 13.5	358 33.2	S11 45.1	Canopus	263 53.2	S52 42.1
	01	350 00.9	216 19.5	13.9	170 02.7	45.5	306 37.6	13.5	13 35.8	45.1	Capella	280 23.7	N46 01.2
	02	5 03.3	231 22.7	14.3	185 03.7	44.9	321 40.0	13.5	28 38.5	45.2	Deneb	49 26.2	N45 22.0
	03	20 05.8	246 25.8	14.7	200 04.7	44.2	336 42.4	13.6	43 41.1	45.3	Denebola	182 26.4	N14 26.6
	04	35 08.3	261 29.0	15.0	215 05.7	43.6	351 44.8	13.6	58 43.8	45.3	Diphda	348 48.2	S17 51.3
	05	50 10.7	276 32.2	15.4	230 06.7	42.9	6 47.2	13.6	73 46.4	45.4			
	06	65 13.2	291 35.3	N 9 15.8	245 07.7	N 0 42.3	21 49.6	N15 13.6	88 49.0	S11 45.5	Dubhe	193 43.0	N61 37.6
	07	80 15.7	306 38.5	16.2	260 08.7	41.6	36 52.0	13.6	103 51.7	45.6	Elnath	278 03.4	N28 37.6
	08	95 18.1	321 41.6	16.6	275 09.7	40.9	51 54.4	13.6	118 54.3	45.6	Eltanin	90 42.5	N51 29.4
	09	110 20.6	336 44.8	17.0	290 10.7	40.3	66 56.8	13.6	133 57.0	45.7	Enif	33 39.6	N 9 59.1
	10	125 23.1	351 47.9	17.4	305 11.7	39.6	81 59.2	13.6	148 59.6	45.8	Fomalhaut	15 15.4	S29 29.7
	11	140 25.5	6 51.1	17.8	320 12.7	39.0	97 01.6	13.6	164 02.3	45.8			
	12	155 28.0	21 54.2	N 9 18.2	335 13.7	N 0 38.3	112 04.0	N15 13.7	179 04.9	S11 45.9	Gacrux	171 53.4	S57 14.8
	13	170 30.5	36 57.4	18.6	350 14.7	37.6	127 06.3	13.7	194 07.5	46.0	Gienah	175 45.0	S17 40.3
	14	185 32.9	52 00.5	19.0	5 15.7	37.0	142 08.7	13.7	209 10.2	46.1	Hadar	148 38.0	S60 29.4
	15	200 35.4	67 03.6	19.3	20 16.7	36.3	157 11.1	13.7	224 12.8	46.1	Hamal	327 52.3	N23 34.4
	16	215 37.8	82 06.7	19.7	35 17.7	35.7	172 13.5	13.7	239 15.5	46.2	Kaus Aust.	83 33.8	S34 22.5
	17	230 40.3	97 09.9	20.1	50 18.7	35.0	187 15.9	13.7	254 18.1	46.3			
	18	245 42.8	112 13.0	N 9 20.5	65 19.7	N 0 34.4	202 18.3	N15 13.7	269 20.8	S11 46.3	Kochab	137 20.1	N74 03.8
	19	260 45.2	127 16.1	20.9	80 20.7	33.7	217 20.7	13.7	284 23.4	46.4	Markab	13 30.7	N15 20.0
	20	275 47.7	142 19.2	21.3	95 21.7	33.0	232 23.1	13.8	299 26.1	46.5	Menkar	314 07.2	N 4 11.0
	21	290 50.2	157 22.3	21.7	110 22.7	32.4	247 25.5	13.8	314 28.7	46.6	Menkent	147 59.2	S36 29.2
	22	305 52.6	172 25.4	22.1	125 23.7	31.7	262 27.9	13.8	329 31.3	46.6	Miaplacidus	221 39.4	S69 48.6
23	320 55.1	187 28.5	22.5	140 24.8	31.1	277 30.3	13.8	344 34.0	46.7				
MONDAY	28 00	335 57.6	202 31.6	N 9 22.9	155 25.8	N 0 30.4	292 32.7	N15 13.8	359 36.6	S11 46.8	Mirfak	308 29.8	N49 56.0
	01	351 00.0	217 34.7	23.2	170 26.8	29.7	307 35.1	13.8	14 39.3	46.8	Nunki	75 48.9	S26 16.1
	02	6 02.5	232 37.7	23.6	185 27.8	29.1	322 37.5	13.8	29 41.9	46.9	Peacock	53 07.0	S56 39.6
	03	21 05.0	247 40.8	24.0	200 28.8	28.4	337 39.9	13.8	44 44.6	47.0	Pollux	243 19.0	N27 58.2
	04	36 07.4	262 43.9	24.4	215 29.8	27.8	352 42.3	13.8	59 47.2	47.1	Procyon	244 52.3	N 5 10.0
	05	51 09.9	277 47.0	24.8	230 30.8	27.1	7 44.7	13.8	74 49.8	47.1			
	06	66 12.3	292 50.0	N 9 25.2	245 31.8	N 0 26.5	22 47.1	N15 13.9	89 52.5	S11 47.2	Rasalhague	95 59.5	N12 32.7
	07	81 14.8	307 53.1	25.6	260 32.8	25.8	37 49.5	13.9	104 55.1	47.3	Regulus	207 36.0	N11 51.3
	08	96 17.3	322 56.1	26.0	275 33.8	25.1	52 51.9	13.9	119 57.8	47.3	Rigel	281 05.0	S 8 10.3
	09	111 19.7	337 59.2	26.3	290 34.8	24.5	67 54.3	13.9	135 00.4	47.4	Rigel Kent.	139 42.2	S60 56.1
	10	126 22.2	353 02.2	26.7	305 35.8	23.8	82 56.7	13.9	150 03.1	47.5	Sabik	102 04.0	S15 45.2
	11	141 24.7	8 05.3	27.1	320 36.8	23.2	97 59.1	13.9	165 05.7	47.6			
	12	156 27.1	23 08.3	N 9 27.5	335 37.8	N 0 22.5	113 01.5	N15 13.9	180 08.3	S11 47.6	Schedar	349 31.9	N56 39.9
	13	171 29.6	38 11.4	27.9	350 38.8	21.8	128 03.9	13.9	195 11.0	47.7	Shaula	96 11.8	S37 07.3
	14	186 32.1	53 14.4	28.3	5 39.8	21.2	143 06.3	13.9	210 13.6	47.8	Sirius	258 27.4	S16 44.7
	15	201 34.5	68 17.4	28.7	20 40.8	20.5	158 08.8	13.9	225 16.3	47.8	Spica	158 23.7	S11 17.0
	16	216 37.0	83 20.4	29.1	35 41.8	19.9	173 11.2	13.9	240 18.9	47.9	Suhail	222 47.6	S43 31.5
	17	231 39.5	98 23.5	29.4	50 42.8	19.2	188 13.6	14.0	255 21.6	48.0			
	18	246 41.9	113 26.5	N 9 29.8	65 43.8	N 0 18.5	203 16.0	N15 14.0	270 24.2	S11 48.1	Vega	80 33.7	N38 48.5
	19	261 44.4	128 29.5	30.2	80 44.8	17.9	218 18.4	14.0	285 26.8	48.1	Zuben'ubi	136 57.4	S16 08.3
	20	276 46.8	143 32.5	30.6	95 45.8	17.2	233 20.8	14.0	300 29.5	48.2			
	21	291 49.3	158 35.5	31.0	110 46.8	16.6	248 23.2	14.0	315 32.1	48.3		SHA	Mer.Pass.
	22	306 51.8	173 38.5	31.4	125 47.8	15.9	263 25.6	14.0	330 34.8	48.3	Venus	226 17.9	h m
23	321 54.2	188 41.5	31.7	140 48.8	15.3	278 28.0	14.0	345 37.4	48.4	Mars	180 03.2	13 39	
	h m									Jupiter	316 36.8	4 33	
Mer.Pass.	1 39.8	v 3.1	d 0.4	v 1.0	d 0.7	v 2.4	d 0.0	v 2.6	d 0.1	Saturn	23 34.8	0 06	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise									
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	26	27	28	29					
	°	'		°	'																	
SATURDAY	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m					
	00	179	29.5	N10	34.4	72	33.7	4.6	S27	27.3	3.7	58.6	N 70	///	01 46	03 34	■	■	■	■		
	01	194	29.6		33.5	86	57.3	4.6	27	31.0	3.5	58.6	N 70	///	02 28	03 52	■	■	■	22 08		
	02	209	29.8		32.6	101	20.9	4.5	27	34.5	3.3	58.7	68	///	02 55	04 06	■	■	■	21 11		
	03	224	30.0		31.8	115	44.4	4.5	27	37.8	3.2	58.7	66	01 32	03 15	04 18	■	■	■	20 36		
	04	239	30.2		30.9	130	07.9	4.3	27	41.0	3.0	58.7	64	02 09	03 31	04 27	■	■	■	20 11		
	05	254	30.3		30.0	144	31.2	4.2	27	44.0	2.8	58.8	62	02 34	03 44	04 35	■	20 06	19 57	19 51		
	06	269	30.5	N10	29.2	158	54.4	4.2	S27	46.8	2.6	58.8	60	02 53	03 56	04 42	18 30	19 14	19 29	19 35		
	07	284	30.7		28.3	173	17.6	4.0	27	49.4	2.4	58.9	N 58	03 08	04 05	04 48	17 51	18 42	19 08	19 21		
	08	299	30.9		27.4	187	40.6	4.0	27	51.8	2.3	58.9	56	03 21	04 13	04 54	17 24	18 18	18 50	19 09		
SUNDAY	09	314	31.0		26.6	202	03.6	3.9	27	54.1	2.0	58.9	54	03 32	04 21	04 59	17 03	17 58	18 35	18 58		
	10	329	31.2		25.7	216	26.5	3.9	27	56.1	1.9	59.0	52	03 42	04 27	05 03	16 45	17 42	18 22	18 49		
	11	344	31.4		24.8	230	49.4	3.7	27	58.0	1.7	59.0	50	03 50	04 33	05 07	16 30	17 28	18 10	18 40		
	12	359	31.6	N10	24.0	245	12.1	3.7	S27	59.7	1.5	59.1	45	04 07	04 45	05 16	15 59	16 59	17 46	18 22		
	13	14	31.8		23.1	259	34.8	3.6	28	01.2	1.3	59.1	N 40	04 21	04 55	05 23	15 35	16 36	17 26	18 08		
	14	29	31.9		22.2	273	57.4	3.5	28	02.5	1.2	59.1	35	04 32	05 03	05 29	15 16	16 17	17 10	17 55		
	15	44	32.1		21.3	288	19.9	3.5	28	03.7	0.9	59.2	30	04 40	05 09	05 34	14 59	16 01	16 56	17 44		
	16	59	32.3		20.5	302	42.4	3.4	28	04.6	0.7	59.2	20	04 54	05 21	05 43	14 31	15 33	16 32	17 25		
	17	74	32.5		19.6	317	04.8	3.4	28	05.3	0.6	59.2	N 10	05 05	05 30	05 51	14 07	15 10	16 11	17 08		
	18	89	32.6	N10	18.7	331	27.2	3.3	S28	05.9	0.3	59.3	0	05 13	05 37	05 58	13 44	14 48	15 51	16 53		
MONDAY	19	104	32.8		17.9	345	49.5	3.2	28	06.2	0.2	59.3	S 10	05 20	05 44	06 05	13 22	14 26	15 32	16 37		
	20	119	33.0		17.0	0	11.7	3.2	28	06.4	0.0	59.3	20	05 25	05 51	06 13	12 58	14 02	15 11	16 20		
	21	134	33.2		16.1	14	33.9	3.1	28	06.4	0.3	59.4	30	05 29	05 57	06 21	12 30	13 34	14 46	16 00		
	22	149	33.4		15.3	28	56.0	3.1	28	06.1	0.4	59.4	35	05 31	06 01	06 26	12 13	13 18	14 32	15 49		
	23	164	33.5		14.4	43	18.1	3.1	28	05.7	0.6	59.5	40	05 33	06 04	06 32	11 54	12 59	14 15	15 36		
	00	179	33.7	N10	13.5	57	40.2	3.0	S28	05.1	0.9	59.5	45	05 34	06 08	06 38	11 31	12 36	13 55	15 20		
	01	194	33.9		12.6	72	02.2	2.9	28	04.2	1.0	59.5	S 50	05 35	06 13	06 45	11 01	12 07	13 29	15 01		
	02	209	34.1		11.8	86	24.1	3.0	28	03.2	1.2	59.6	52	05 35	06 15	06 49	10 46	11 52	13 17	14 52		
	03	224	34.3		10.9	100	46.1	2.8	28	02.0	1.5	59.6	54	05 36	06 17	06 53	10 29	11 35	13 03	14 41		
	04	239	34.4		10.0	115	07.9	2.9	28	00.5	1.6	59.6	56	05 36	06 19	06 57	10 09	11 15	12 46	14 30		
TUESDAY	05	254	34.6		09.1	129	29.8	2.8	27	58.9	1.8	59.7	58	05 36	06 21	07 01	09 44	10 50	12 26	14 16		
	06	269	34.8	N10	08.3	143	51.6	2.8	S27	57.1	2.1	59.7	S 60	05 36	06 24	07 07	09 09	10 15	12 01	14 00		
	07	284	35.0		07.4	158	13.4	2.8	27	55.0	2.2	59.7	Lat.		Twilight		Moonset					
	08	299	35.2		06.5	172	35.2	2.8	27	52.8	2.4	59.8	Sunset		Civil		Naut.		26	27	28	29
	09	314	35.3		05.6	186	57.0	2.7	27	50.4	2.7	59.8							h m	h m	h m	h m
	10	329	35.5		04.8	201	18.7	2.7	27	47.7	2.8	59.9							h m	h m	h m	h m
	11	344	35.7		03.9	215	40.4	2.7	27	44.9	3.1	59.9	N 72	20 25	22 08	///	■	■	■	■		
	12	359	35.9	N10	03.0	230	02.1	2.7	S27	41.8	3.2	59.9	N 70	20 08	21 30	///	■	■	■	■		
	13	14	36.1		02.1	244	23.8	2.7	27	38.6	3.5	60.0	68	19 54	21 04	23 37	■	■	■	■		
	14	29	36.2		01.3	258	45.5	2.7	27	35.1	3.6	60.0	66	19 43	20 45	22 24	■	■	■	■		
WEDNESDAY	15	44	36.4	10	00.4	273	07.2	2.7	27	31.5	3.9	60.0	64	19 34	20 29	21 50	■	■	■	23 50	26 21	
	16	59	36.6	9	59.5	287	28.9	2.7	27	27.6	4.0	60.1	62	19 26	20 16	21 26	■	22 07	24 28	00 28	00 28	
	17	74	36.8		58.6	301	50.6	2.7	27	23.6	4.3	60.1	60	19 19	20 06	21 07	21 29	22 58	24 55	00 55		
	18	89	37.0	N 9	57.8	316	12.3	2.7	S27	19.3	4.4	60.1	N 58	19 13	19 56	20 52	22 07	23 30	25 16	01 16		
	19	104	37.2		56.9	330	34.0	2.7	27	14.9	4.7	60.2	56	19 08	19 48	20 40	22 34	23 54	25 33	01 33		
	20	119	37.3		56.0	344	55.7	2.7	27	10.2	4.9	60.2	54	19 03	19 41	20 29	22 56	24 13	00 13	01 48		
	21	134	37.5		55.1	359	17.4	2.7	27	05.3	5.1	60.2	52	18 59	19 35	20 20	23 13	24 29	00 29	02 00		
	22	149	37.7		54.2	13	39.1	2.8	27	00.2	5.2	60.2	50	18 55	19 29	20 11	23 29	24 43	00 43	02 11		
	23	164	37.9		53.4	28	00.9	2.7	26	55.0	5.5	60.3	45	18 47	19 17	19 55	23 59	25 11	01 11	02 34		
	00	179	38.1	N 9	52.5	42	22.6	2.8	S26	49.5	5.7	60.3	N 40	18 40	19 08	19 42	24 23	00 23	01 34	02 53		
01	194	38.2		51.6	56	44.4	2.8	26	43.8	5.8	60.3	35	18 34	19 00	19 31	24 42	00 42	01 52	03 08			
02	209	38.4		50.7	71	06.2	2.9	26	38.0	6.1	60.4	30	18 29	18 53	19 22	24 59	00 59	02 08	03 21			
03	224	38.6		49.9	85	28.1	2.8	26	31.9	6.3	60.4	20	18 20	18 42	19 09	00 26	01 28	02 34	03 44			
04	239	38.8		49.0	99	49.9	3.0	26	25.6	6.5	60.4	N 10	18 12	18 33	18 58	00 50	01 52	02 57	04 03			
05	254	39.0		48.1	114	11.9	2.9	26	19.1	6.6	60.5	0	18 05	18 26	18 50	01 12	02 14	03 18	04 21			
06	269	39.2	N 9	47.2	128	33.8	3.0	S26	12.5	6.9	60.5	S 10	17 58	18 19	18 44	01 34	02 37	03 39	04 39			
07	284	39.4		46.3	142	55.8	3.0	26	05.6	7.0	60.5	20	17 50	18 13	18 39	01 58	03 01	04 02	05 17			
08	299	39.5		45.4	157	17.8	3.1	25	58.6	7.3	60.5	30	17 42	18 06	18 34	02 25	03 29	04 28	05 59			
09	314	39.7		44.6	171	39.9	3.1	25	51.3	7.4	60.6	35	17 37	18 03	18 33	02 41	03 45	04 43	05 52			
10	329	39.9		43.7	186	02.0	3.1	25	43.9	7.7	60.6	40	17 32	18 00	18 31	03 00	04 05	05 00	05 46			
11	344	40.1		42.8	200	24.1	3.2	25	36.2	7.8	60.6	45	17 26	17 56	18 30	03 23	04 28	05 21	06 03			
12	359	40.3	N 9	41.9	214	46.3	3.2	S25	28.4	8.0	60.7	S 50	17 19	17 51	18 29	03 53	04 58	05 48	06 24			
13	14	40.5		41.0	229	08.5	3.4	25	20.4	8.2	60.7	52	17 15	17 50	18 29	04 07	05 12	06 00	06 34			
14	29	40.6		40.2	243	30.9	3.3	25	12.2	8.4	60.7	54	17 11	17 47	18 29	04 24	05 29	06 15	06 45			
15	44	40.8		39.3	257	53.2	3.4	25	03.8	8.6												

UT	ARIES	VENUS -4.6			MARS +1.7		JUPITER -2.6		SATURN +0.4			STARS				
	GHA ° / ' / "	GHA ° / ' / "	Dec ° / ' / "		GHA ° / ' / "	Dec ° / ' / "		GHA ° / ' / "	Dec ° / ' / "		GHA ° / ' / "	Dec ° / ' / "		Name	SHA ° / ' / "	Dec ° / ' / "
TUESDAY	2900	336 56.7	203 44.5 N	9 32.1	155 49.8 N	0 14.6		293 30.4 N15	14.0		0 40.1 S11	48.5		Acamar	315 12.5 S40	12.3
	01	351 59.2	218 47.5	32.5	170 50.8	13.9		308 32.8	14.0		15 42.7	48.6		Achernar	335 20.6 S57	06.7
	02	7 01.6	233 50.4	32.9	185 51.8	13.3		323 35.2	14.0		30 45.3	48.6		Acrux	173 02.0 S63	13.9
	03	22 04.1	248 53.4	33.3	200 52.8	12.6		338 37.6	14.0		45 48.0	48.7		Adhara	255 07.0 S29	00.0
	04	37 06.6	263 56.4	33.7	215 53.8	12.0		353 40.0	14.0		60 50.6	48.8		Aldebaran	290 40.9 N16	33.4
	05	52 09.0	278 59.4	34.0	230 54.8	11.3		8 42.5	14.1		75 53.3	48.8				
	06	67 11.5	294 02.3 N	9 34.4	245 55.8 N	0 10.6		23 44.9 N15	14.1		90 55.9 S11	48.9		Alioth	166 14.4 N55	50.1
	07	82 13.9	309 05.3	34.8	260 56.8	10.0		38 47.3	14.1		105 58.6	49.0		Alkaid	152 53.2 N49	12.0
	08	97 16.4	324 08.2	35.2	275 57.8	09.3		53 49.7	14.1		121 01.2	49.1		Alnair	27 33.8 S46	50.8
	09	112 18.9	339 11.2	35.6	290 58.8	08.7		68 52.1	14.1		136 03.8	49.1		Alnilam	275 39.0 S 1	11.0
	10	127 21.3	354 14.1	35.9	305 59.8	08.0		83 54.5	14.1		151 06.5	49.2		Alphard	217 49.2 S 8	45.5
	11	142 23.8	9 17.1	36.3	321 00.8	07.3		98 56.9	14.1		166 09.1	49.3				
	12	157 26.3	24 20.0 N	9 36.7	336 01.8 N	0 06.7		113 59.3 N15	14.1		181 11.8 S11	49.3		Alphecca	126 04.8 N26	38.3
	13	172 28.7	39 23.0	37.1	351 02.8	06.0		129 01.7	14.1		196 14.4	49.4		Alpheratz	357 35.6 N29	13.3
	14	187 31.2	54 25.9	37.5	6 03.8	05.4		144 04.1	14.1		211 17.1	49.5		Altair	62 00.8 N 8	55.9
	15	202 33.7	69 28.8	37.8	21 04.8	04.7		159 06.6	14.1		226 19.7	49.6		Ankaa	353 07.9 S42	10.5
	16	217 36.1	84 31.7	38.2	36 05.8	04.0		174 09.0	14.1		241 22.3	49.6		Antares	112 17.2 S26	29.1
	17	232 38.6	99 34.7	38.6	51 06.8	03.4		189 11.4	14.1		256 25.0	49.7				
	18	247 41.1	114 37.6 N	9 39.0	66 07.8 N	0 02.7		204 13.8 N15	14.1		271 27.6 S11	49.8		Arcturus	145 49.1 N19	03.8
	19	262 43.5	129 40.5	39.4	81 08.8	02.1		219 16.2	14.1		286 30.3	49.8		Atria	107 12.4 S69	04.4
	20	277 46.0	144 43.4	39.7	96 09.8	01.4		234 18.6	14.2		301 32.9	49.9		Avior	234 15.8 S59	34.8
	21	292 48.4	159 46.3	40.1	111 10.8	00.8		249 21.0	14.2		316 35.6	50.0		Bellatrix	278 24.2 N 6	22.4
	22	307 50.9	174 49.2	40.5	126 11.8 N	00.1		264 23.5	14.2		331 38.2	50.0		Betelgeuse	270 53.4 N 7	24.8
	23	322 53.4	189 52.1	40.9	141 12.8 S	00.6		279 25.9	14.2		346 40.8	50.1				
WEDNESDAY	3000	337 55.8	204 55.0 N	9 41.2	156 13.8 S	0 01.2		294 28.3 N15	14.2		1 43.5 S11	50.2		Canopus	263 53.2 S52	42.1
	01	352 58.3	219 57.9	41.6	171 14.8	01.9		309 30.7	14.2		16 46.1	50.3		Capella	280 23.7 N46	01.2
	02	8 00.8	235 00.7	42.0	186 15.8	02.5		324 33.1	14.2		31 48.8	50.3		Deneb	49 26.2 N45	22.0
	03	23 03.2	250 03.6	42.4	201 16.8	03.2		339 35.5	14.2		46 51.4	50.4		Denebola	182 26.4 N14	26.6
	04	38 05.7	265 06.5	42.7	216 17.8	03.9		354 38.0	14.2		61 54.1	50.5		Diphda	348 48.1 S17	51.3
	05	53 08.2	280 09.3	43.1	231 18.8	04.5		9 40.4	14.2		76 56.7	50.5				
	06	68 10.6	295 12.2 N	9 43.5	246 19.8 S	0 05.2		24 42.8 N15	14.2		91 59.3 S11	50.6		Dubhe	193 43.0 N61	37.6
	07	83 13.1	310 15.1	43.9	261 20.8	05.8		39 45.2	14.2		107 02.0	50.7		Elnath	278 03.4 N28	37.6
	08	98 15.6	325 17.9	44.2	276 21.8	06.5		54 47.6	14.2		122 04.6	50.8		Eltanin	90 42.5 N51	29.4
	09	113 18.0	340 20.8	44.6	291 22.8	07.2		69 50.0	14.2		137 07.3	50.8		Enif	33 39.6 N 9	59.1
	10	128 20.5	355 23.6	45.0	306 23.8	07.8		84 52.5	14.2		152 09.9	50.9		Fomalhaut	15 15.4 S29	29.7
	11	143 22.9	10 26.5	45.3	321 24.8	08.5		99 54.9	14.2		167 12.6	51.0				
	12	158 25.4	25 29.3 N	9 45.7	336 25.8 S	0 09.1		114 57.3 N15	14.2		182 15.2 S11	51.0		Gacrux	171 53.4 S57	14.8
	13	173 27.9	40 32.1	46.1	351 26.8	09.8		129 59.7	14.2		197 17.8	51.1		Gienah	175 45.0 S17	40.3
	14	188 30.3	55 35.0	46.5	6 27.8	10.5		145 02.1	14.2		212 20.5	51.2		Hadar	148 38.0 S60	29.4
	15	203 32.8	70 37.8	46.8	21 28.8	11.1		160 04.6	14.3		227 23.1	51.3		Hamal	327 52.3 N23	34.4
	16	218 35.3	85 40.6	47.2	36 29.8	11.8		175 07.0	14.3		242 25.8	51.3		Kaus Aust.	83 33.8 S34	22.5
	17	233 37.7	100 43.4	47.6	51 30.8	12.4		190 09.4	14.3		257 28.4	51.4				
	18	248 40.2	115 46.2 N	9 47.9	66 31.8 S	0 13.1		205 11.8 N15	14.3		272 31.1 S11	51.5		Kochab	137 20.2 N74	03.8
	19	263 42.7	130 49.0	48.3	81 32.8	13.8		220 14.3	14.3		287 33.7	51.5		Markab	13 30.7 N15	20.0
	20	278 45.1	145 51.8	48.7	96 33.8	14.4		235 16.7	14.3		302 36.3	51.6		Menkar	314 07.2 N 4	11.0
	21	293 47.6	160 54.6	49.0	111 34.8	15.1		250 19.1	14.3		317 39.0	51.7		Menkent	147 59.2 S36	29.2
	22	308 50.0	175 57.4	49.4	126 35.8	15.7		265 21.5	14.3		332 41.6	51.8		Miaplacidus	221 39.4 S69	48.6
	23	323 52.5	191 00.2	49.8	141 36.8	16.4		280 23.9	14.3		347 44.3	51.8				
THURSDAY	3100	338 55.0	206 03.0 N	9 50.1	156 37.8 S	0 17.1		295 26.4 N15	14.3		2 46.9 S11	51.9		Mirfak	308 29.8 N49	56.5
	01	353 57.4	221 05.8	50.5	171 38.8	17.7		310 28.8	14.3		17 49.6	52.0		Nunki	75 48.9 S26	16.1
	02	8 59.9	236 08.6	50.9	186 39.8	18.4		325 31.2	14.3		32 52.2	52.0		Peacock	53 07.0 S56	39.6
	03	24 02.4	251 11.3	51.2	201 40.8	19.0		340 33.6	14.3		47 54.8	52.1		Pollux	243 19.0 N27	58.2
	04	39 04.8	266 14.1	51.6	216 41.8	19.7		355 36.1	14.3		62 57.5	52.2		Procyon	244 52.3 N 5	10.0
	05	54 07.3	281 16.9	52.0	231 42.8	20.4		10 38.5	14.3		78 00.1	52.2				
	06	69 09.8	296 19.6 N	9 52.3	246 43.8 S	0 21.0		25 40.9 N15	14.3		93 02.8 S11	52.3		Rasalhague	95 59.5 N12	32.7
	07	84 12.2	311 22.4	52.7	261 44.8	21.7		40 43.3	14.3		108 05.4	52.4		Regulus	207 36.0 N11	51.3
	08	99 14.7	326 25.1	53.1	276 45.8	22.3		55 45.8	14.3		123 08.1	52.5		Rigel	281 05.0 S 8	10.3
	09	114 17.2	341 27.9	53.4	291 46.8	23.0		70 48.2	14.3		138 10.7	52.5		Rigel Kent.	139 42.2 S60	56.1
	10	129 19.6	356 30.6	53.8	306 47.8	23.7		85 50.6	14.3		153 13.3	52.6		Sabik	102 04.0 S15	45.2
	11	144 22.1	11 33.4	54.2	321 48.8	24.3		100 53.1	14.3		168 16.0	52.7				
	12	159 24.5	26 36.1 N	9 54.5	336 49.8 S	0 25.0		115 55.5 N15	14.3		183 18.6 S11	52.7		Schedar	349 31.9 N56	39.9
	13	174 27.0	41 38.8	54.9	351 50.8	25.6		130 57.9	14.3		198 21.3	52.8		Shaula	96 11.8 S37	07.3
	14	189 29.5	56 41.6	55.2	6 51.8	26.3		146 00.3	14.3		213 23.9	52.9		Sirius	258 27.4 S16	44.7
	15	204 31.9	71 44.3	55.6	21 52.8	27.0		161 02.8	14.3		228 26.6	53.0		Spica	158 23.7 S11	17.0
	16	219 34.4	86 47.0	56.0	36 53.8	27.6		176 05.2	14.3		243 29.2	53.0		Suhail	222 47.6 S43	31.5
	17	234 36.9	101 49.7	56.3	51 54.8	28.3		191 07.6	14.3		258 31.8	53.1				
	18	249 39.3	116 52.4 N	9 56.7	66 55.8 S	0 28.9		206 10.1 N15	14.3		273 34.5 S11	53.2		Vega	80 33.8 N38	48.5
	19	264 41.8	131 55.1	57.0	81 56.8	29.6		221 12.5	14.3		288 37.1	53.2		Zuben'ubi	136 57.4 S16	08.4
	20	279 44.3	146 57.8	57.4	96 57.8	30.3		236 14.9	14.3		303 39.8	53.3				
	21	294 46.7	162 00.5	57.7	111 58.8	30.9										

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	29	30	31	1
	°	'			°	'												
TUESDAY	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m
	N 72	////	02 13	03 50	██	21 12	20 19	19 39										
	00	179 42.5	N 9 31.3	27 17.2	4.0	S23 39.9	10.2	60.9	N 70	////	02 46	04 05	22 08	20 46	20 08	19 39		
	01	194 42.7	30.4	41 40.2	4.0	23 29.7	10.4	61.0	68	01 05	03 09	04 17	21 11	20 27	20 00	19 38		
	02	209 42.9	29.5	56 03.2	4.2	23 19.3	10.5	61.0	66	01 55	03 27	04 28	20 36	20 11	19 53	19 38		
	03	224 43.1	28.7	70 26.4	4.2	23 08.8	10.7	61.0	64	02 24	03 42	04 36	20 11	19 58	19 47	19 38		
	04	239 43.3	27.8	84 49.6	4.3	22 58.1	10.9	61.0	62	02 46	03 54	04 43	19 51	19 46	19 42	19 38		
	05	254 43.5	26.9	99 12.9	4.4	22 47.2	11.1	61.0	60	03 03	04 04	04 49	19 35	19 37	19 37	19 37		
	06	269 43.6	N 9 26.0	113 36.3	4.5	S22 36.1	11.2	61.1	N 58	03 17	04 12	04 55	19 21	19 28	19 33	19 37		
	07	284 43.8	25.1	127 59.8	4.5	22 24.9	11.4	61.1	56	03 29	04 20	05 00	19 09	19 21	19 30	19 37		
	08	299 44.0	24.2	142 23.3	4.6	22 13.5	11.6	61.1	54	03 39	04 26	05 04	18 58	19 14	19 27	19 37		
	09	314 44.2	23.3	156 46.9	4.7	22 01.9	11.7	61.1	52	03 48	04 32	05 08	18 49	19 08	19 24	19 37		
	10	329 44.4	22.5	171 10.6	4.8	21 50.2	11.9	61.1	50	03 56	04 38	05 11	18 40	19 03	19 21	19 37		
	11	344 44.6	21.6	185 34.4	4.9	21 38.3	12.0	61.2	45	04 12	04 49	05 19	18 22	18 51	19 15	19 36		
	12	359 44.8	N 9 20.7	199 58.3	4.9	S21 26.3	12.2	61.2	N 40	04 24	04 58	05 26	18 08	18 41	19 10	19 36		
	13	14 45.0	19.8	214 22.2	5.1	21 14.1	12.3	61.2	35	04 34	05 05	05 31	17 55	18 33	19 06	19 36		
	14	29 45.1	18.9	228 46.3	5.1	21 01.8	12.5	61.3	30	04 42	05 11	05 36	17 44	18 25	19 02	19 36		
	15	44 45.3	18.0	243 10.4	5.2	20 49.3	12.6	61.2	20	04 55	05 21	05 44	17 25	18 12	18 55	19 35		
	16	59 45.5	17.1	257 34.6	5.3	20 36.7	12.8	61.2	N 10	05 05	05 30	05 51	17 08	18 01	18 49	19 35		
	17	74 45.7	16.2	271 58.9	5.4	20 23.9	12.9	61.2	0	05 12	05 36	05 57	16 53	17 50	18 44	19 35		
	18	89 45.9	N 9 15.3	286 23.3	5.5	S20 11.0	13.1	61.3	S 10	05 18	05 43	06 04	16 37	17 39	18 38	19 35		
	19	104 46.1	14.4	300 47.8	5.6	19 57.9	13.2	61.3	20	05 23	05 48	06 11	16 20	17 28	18 32	19 35		
	20	119 46.3	13.6	315 12.4	5.6	19 44.7	13.3	61.3	30	05 26	05 54	06 18	16 00	17 14	18 26	19 34		
	21	134 46.5	12.7	329 37.0	5.8	19 31.4	13.5	61.3	35	05 27	05 57	06 22	15 49	17 06	18 22	19 34		
22	149 46.7	11.8	344 01.8	5.8	19 17.9	13.6	61.3	40	05 28	06 00	06 27	15 36	16 58	18 17	19 34			
23	164 46.9	10.9	358 26.6	6.0	19 04.3	13.7	61.3	45	05 29	06 03	06 33	15 20	16 47	18 12	19 34			
WEDNESDAY	00	179 47.1	N 9 10.0	12 51.6	6.0	S18 50.6	13.9	61.3	S 50	05 29	06 07	06 39	15 01	16 34	18 06	19 34		
	01	194 47.2	09.1	27 16.6	6.1	18 36.7	14.0	61.3	52	05 29	06 08	06 42	14 52	16 28	18 03	19 34		
	02	209 47.4	08.2	41 41.7	6.2	18 22.7	14.1	61.3	54	05 29	06 10	06 46	14 41	16 22	18 00	19 34		
	03	224 47.6	07.3	56 06.9	6.3	18 08.6	14.3	61.3	56	05 29	06 12	06 49	14 30	16 15	17 56	19 34		
	04	239 47.8	06.4	70 32.2	6.4	17 54.3	14.4	61.3	58	05 28	06 14	06 53	14 16	16 06	17 52	19 34		
	05	254 48.0	05.5	84 57.6	6.4	17 39.9	14.4	61.4	S 60	05 28	06 16	06 58	14 00	15 57	17 48	19 34		
	06	269 48.2	N 9 04.6	99 23.0	6.6	S17 25.5	14.7	61.4	Lat.	Sunset	Twilight		Moonset					
	07	284 48.4	03.7	113 48.6	6.6	17 10.8	14.7	61.4			Civil	Naut.	29	30	31	1		
	08	299 48.6	02.9	128 14.2	6.8	16 56.1	14.8	61.4	°	h m	h m	h m	h m	h m	h m	h m		
	09	314 48.8	02.0	142 40.0	6.8	16 41.3	15.0	61.4	N 72	20 08	21 41	////	██	██	03 27	06 13		
	10	329 49.0	01.1	157 05.8	6.9	16 26.3	15.0	61.4	N 70	19 53	21 11	////	██	00 29	03 50	06 19		
	11	344 49.2	9 00.2	171 31.7	7.1	16 11.3	15.2	61.4	68	19 41	20 48	22 45	██	01 24	04 07	06 25		
	12	359 49.4	N 8 59.3	185 57.8	7.1	S15 56.1	15.2	61.4	66	19 32	20 31	22 01	██	01 57	04 21	06 29		
	13	14 49.5	58.4	200 23.9	7.1	15 40.9	15.4	61.4	64	19 24	20 17	21 33	26 21	02 21	04 32	06 33		
	14	29 49.7	57.5	214 50.0	7.3	15 25.5	15.5	61.4	62	19 17	20 06	21 12	00 28	02 40	04 42	06 36		
	15	44 49.9	56.6	229 16.3	7.4	15 10.0	15.5	61.4	60	19 10	19 56	20 55	00 55	02 55	04 50	06 38		
	16	59 50.1	55.7	243 42.7	7.4	14 54.5	15.7	61.4	N 58	19 05	19 47	20 42	01 16	03 08	04 57	06 41		
	17	74 50.3	54.8	258 09.1	7.6	14 38.8	15.7	61.4	56	19 00	19 40	20 30	01 33	03 19	05 03	06 43		
	18	89 50.5	N 8 53.9	272 35.7	7.6	S14 23.1	15.8	61.4	54	18 56	19 34	20 20	01 48	03 29	05 09	06 45		
	19	104 50.7	53.0	287 02.3	7.7	14 07.3	16.0	61.4	52	18 52	19 28	20 12	02 00	03 37	05 14	06 46		
	20	119 50.9	52.1	301 29.0	7.8	13 51.3	16.0	61.4	50	18 49	19 23	20 04	02 11	03 45	05 18	06 48		
	21	134 51.1	51.2	315 55.8	7.9	13 35.3	16.1	61.4	45	18 41	19 12	19 49	02 34	04 01	05 28	06 51		
	22	149 51.3	50.3	330 22.7	7.9	13 19.2	16.1	61.4	N 40	18 35	19 03	19 36	02 53	04 15	05 36	06 54		
	23	164 51.5	49.4	344 49.6	8.1	13 03.1	16.3	61.4	35	18 30	18 56	19 27	03 08	04 26	05 43	06 57		
THURSDAY	00	179 51.7	N 8 48.5	359 16.7	8.1	S12 46.8	16.3	61.4	30	18 25	18 50	19 18	03 21	04 36	05 48	06 59		
	01	194 51.9	47.6	13 43.8	8.2	12 30.5	16.4	61.4	20	18 17	18 40	19 06	03 44	04 52	05 59	07 02		
	02	209 52.1	46.7	28 11.0	8.3	12 14.1	16.5	61.4	N 10	18 10	18 32	18 56	04 03	05 07	06 08	07 05		
	03	224 52.3	45.8	42 38.3	8.4	11 57.6	16.6	61.4	0	18 04	18 25	18 49	04 21	05 20	06 16	07 08		
	04	239 52.5	44.9	57 05.7	8.4	11 41.0	16.6	61.3	S 10	17 58	18 19	18 44	04 39	05 33	06 24	07 11		
	05	254 52.7	44.0	71 33.1	8.5	11 24.4	16.6	61.3	20	17 51	18 13	18 39	04 57	05 47	06 33	07 14		
	06	269 52.8	N 8 43.1	86 00.6	8.6	S11 07.8	16.8	61.3	30	17 44	18 08	18 36	05 19	06 03	06 42	07 17		
	07	284 53.0	42.2	100 28.2	8.7	10 51.0	16.8	61.3	35	17 40	18 05	18 35	05 32	06 13	06 48	07 19		
	08	299 53.2	41.3	114 55.9	8.7	10 34.2	16.8	61.3	40	17 35	18 02	18 34	05 46	06 23	06 54	07 21		
	09	314 53.4	40.4	129 23.6	8.8	10 17.4	16.9	61.3	45	17 29	17 59	18 33	06 03	06 35	07 01	07 24		
	10	329 53.6	39.5	143 51.4	8.9	10 00.5	17.0	61.3	S 50	17 23	17 56	18 33	06 24	06 50	07 10	07 27		
	11	344 53.8	38.6	158 19.3	9.0	9 43.5	17.0	61.3	52	17 20	17 54	18 33	06 34	06 57	07 14	07 28		
	12	359 54.0	N 8 37.7	172 47.3	9.0	S 9 26.5	17.1	61.3	54	17 17	17 52	18 33	06 45	07 04	07 18	07 29		
	13	14 54.2	36.8	187 15.3	9.1	9 09.4	17.1	61.3	56	17 13	17 51	18 34	06 57	07 12	07 23	07 31		
	14	29 54.4	35.9	201 43.4	9.2	8 52.3	17.2	61.2	58	17 09	17 49	18 34	07 11	07 22	07 28	07 33		
	15	44 54.6	35.0	216 11.6	9.2	8 35.1	17.2	61.2	S 60	17 05	17 47	18 35	07 28	07 33	07 34	07 35		
	16	59 54.8	34.1	230 39.8	9.3	8 17.9	17.2	61.2	Day	SUN		Mer.	MOON		Age	Phase		
	17	74 55.0	33.2	245 08.1	9.4	8 00.7	17.3	61.2		Eqn. of Time	Mer. Pass.		Upper	Lower				
	18	89 55.2	N 8 32.3	259 36.5	9.5	S 7 43.4	17.3	61.2	00 ^h	12 ^h	Pass.							
	19	104 55.4	31.4	274 05.0	9.5	7 26.1	17.4	61.2	d	m s	m s	h m	h m	h m	d	%		
	20	119 55.6	30.5	288 33.5	9.5	7 08.7	17.4	61.2	29	01 10	01 01	12 01	23 06	10 37	13 96			
	21	134 55.8	29.6	303 02.0	9.6	6 51.3	17.4	61.1	30	00 52	00 43	12 01	24 03	11 35	14 99			
	22	149 56.0	28.7	317 30.6	9.7	6 33.9	17.4	61.1	31	00 34	00 24	12 00	00 03	12 30	15 100			
	23	164 56.2	27.8	331 59.3	9.7	S 6 16.5	17.5	61.1	SD	15.9	d	0.9	SD	16.7	16.7	16.7		

UT		ARIES		VENUS -4.7		MARS +1.7		JUPITER -2.6		SATURN +0.4		STARS																	
		GHA		GHA		Dec		GHA		Dec		GHA		Dec		Name		SHA		Dec									
d h		° /		° /		° /		° /		° /		° /		° /				° /		° /									
F R I D A Y	00	339	54.1	207	08.6	N	9	58.8	157	01.8	S	0	32.9	296	24.6	N	15	14.3	3	50.3	S	11	53.6	Acamar	315	12.4	S	40	12.3
	01	354	56.6	222	11.3			59.2	172	02.8			33.6	311	27.1			14.3	18	53.0			53.7	Achernar	335	20.6	S	57	06.8
	02	9	59.0	237	14.0			59.5	187	03.8			34.2	326	29.5			14.3	33	55.6			53.7	Acruz	173	02.0	S	63	13.9
	03	25	01.5	252	16.6		9	59.9	202	04.8			34.9	341	31.9			14.3	48	58.3			53.8	Adhara	255	07.0	S	29	00.0
	04	40	04.0	267	19.3		10	00.2	217	05.8			35.5	356	34.4			14.3	64	00.9			53.9	Aldebaran	290	40.9	N	16	33.4
	05	55	06.4	282	22.0			00.6	232	06.7			36.2	11	36.8			14.3	79	03.5			53.9						
	06	70	08.9	297	24.6	N	10	00.9	247	07.7	S	0	36.9	26	39.2	N	15	14.3	94	06.2	S	11	54.0	Alioth	166	14.4	N	55	50.1
	07	85	11.4	312	27.3			01.3	262	08.7			37.5	41	41.7			14.3	109	08.8			54.1	Alkaid	152	53.2	N	49	12.0
	08	100	13.8	327	29.9			01.6	277	09.7			38.2	56	44.1			14.3	124	11.5			54.2	Alnair	27	33.8	S	46	50.8
	09	115	16.3	342	32.6			02.0	292	10.7			38.8	71	46.5			14.3	139	14.1			54.2	Alnilam	275	39.0	S	1	11.0
	10	130	18.8	357	35.2			02.4	307	11.7			39.5	86	49.0			14.3	154	16.8			54.3	Alphard	217	49.2	S	8	45.5
	11	145	21.2	12	37.8			02.7	322	12.7			40.2	101	51.4			14.3	169	19.4			54.4						
	12	160	23.7	27	40.5	N	10	03.1	337	13.7	S	0	40.8	116	53.9	N	15	14.3	184	22.0	S	11	54.4	Alphecca	126	04.8	N	26	38.3
	13	175	26.1	42	43.1			03.4	352	14.7			41.5	131	56.3			14.3	199	24.7			54.5	Alpheratz	357	35.6	N	29	13.3
	14	190	28.6	57	45.7			03.8	7	15.7			42.2	146	58.7			14.3	214	27.3			54.6	Altair	62	00.8	N	8	56.0
	15	205	31.1	72	48.4			04.1	22	16.7			42.8	162	01.2			14.3	229	30.0			54.6	Ankaa	353	07.9	S	42	10.5
	16	220	33.5	87	51.0			04.4	37	17.7			43.5	177	03.6			14.3	244	32.6			54.7	Antares	112	17.2	S	26	29.1
	17	235	36.0	102	53.6			04.8	52	18.7			44.1	192	06.0			14.3	259	35.3			54.8						
	18	250	38.5	117	56.2	N	10	05.1	67	19.7	S	0	44.8	207	08.5	N	15	14.3	274	37.9	S	11	54.9	Arcturus	145	49.1	N	19	03.8
	19	265	40.9	132	58.8			05.5	82	20.7			45.5	222	10.9			14.3	289	40.5			54.9	Atria	107	12.4	S	69	04.4
	20	280	43.4	148	01.4			05.8	97	21.7			46.1	237	13.4			14.3	304	43.2			55.0	Avior	234	15.7	S	59	34.8
	21	295	45.9	163	04.0			06.2	112	22.7			46.8	252	15.8			14.3	319	45.8			55.1	Bellatrix	278	24.2	N	6	22.4
	22	310	48.3	178	06.6			06.5	127	23.7			47.4	267	18.2			14.3	334	48.5			55.1	Betelgeuse	270	53.4	N	7	24.8
	23	325	50.8	193	09.2			06.9	142	24.7			48.1	282	20.7			14.3	349	51.1			55.2						
S A T U R D A Y	00	340	53.3	208	11.7	N	10	07.2	157	25.7	S	0	48.8	297	23.1	N	15	14.3	4	53.7	S	11	55.3	Canopus	263	53.1	S	52	42.1
	01	355	55.7	223	14.3			07.6	172	26.7			49.4	312	25.6			14.3	19	56.4			55.3	Capella	280	23.6	N	46	01.2
	02	10	58.2	238	16.9			07.9	187	27.6			50.1	327	28.0			14.3	34	59.0			55.4	Deneb	49	26.2	N	45	22.0
	03	26	00.6	253	19.5			08.2	202	28.6			50.7	342	30.4			14.3	50	01.7			55.5	Denebola	182	26.4	N	14	26.6
	04	41	03.1	268	22.0			08.6	217	29.6			51.4	357	32.9			14.3	65	04.3			55.6	Diphda	348	48.1	S	17	51.3
	05	56	05.6	283	24.6			08.9	232	30.6			52.1	12	35.3			14.3	80	07.0			55.6						
	06	71	08.0	298	27.2	N	10	09.3	247	31.6	S	0	52.7	27	37.8	N	15	14.3	95	09.6	S	11	55.7	Dubhe	193	43.0	N	61	37.5
	07	86	10.5	313	29.7			09.6	262	32.6			53.4	42	40.2			14.3	110	12.2			55.8	Elnath	278	03.4	N	28	37.6
	08	101	13.0	328	32.3			09.9	277	33.6			54.0	57	42.6			14.3	125	14.9			55.8	Eltanin	90	42.5	N	51	29.4
	09	116	15.4	343	34.8			10.3	292	34.6			54.7	72	45.1			14.3	140	17.5			55.9	Enif	33	39.6	N	9	59.1
	10	131	17.9	358	37.3			10.6	307	35.6			55.4	87	47.5			14.3	155	20.2			56.0	Fomalhaut	15	15.4	S	29	29.7
	11	146	20.4	13	39.9			11.0	322	36.6			56.0	102	50.0			14.3	170	22.8			56.0						
	12	161	22.8	28	42.4	N	10	11.3	337	37.6	S	0	56.7	117	52.4	N	15	14.3	185	25.5	S	11	56.1	Gacrux	171	53.4	S	57	14.8
	13	176	25.3	43	44.9			11.6	352	38.6			57.3	132	54.9			14.3	200	28.1			56.2	Gienah	175	45.1	S	17	40.3
	14	191	27.7	58	47.5			12.0	7	39.6			58.0	147	57.3			14.3	215	30.7			56.3	Hadar	148	38.0	S	60	29.3
	15	206	30.2	73	50.0			12.3	22	40.6			58.7	162	59.8			14.3	230	33.4			56.3	Hamal	327	52.3	N	23	34.4
	16	221	32.7	88	52.5			12.6	37	41.6			0 59.3	178	02.2			14.3	245	36.0			56.4	Kaus Aust.	83	33.8	S	34	22.5
	17	236	35.1	103	55.0			13.0	52	42.6		1	00.0	193	04.6			14.3	260	38.7			56.5						
	18	251	37.6	118	57.5	N	10	13.3	67	43.6	S	1	00.7	208	07.1	N	15	14.3	275	41.3	S	11	56.5	Kochab	137	20.2	N	74	03.8
	19	266	40.1	134	00.0			13.6	82	44.5			01.3	223	09.5			14.3	290	43.9			56.6	Markab	13	30.7	N	15	20.0
	20	281	42.5	149	02.5			14.0	97	45.5			02.0	238	12.0			14.3	305	46.6			56.7	Menkar	314	07.2	N	4	11.0
	21	296	45.0	164	05.0			14.3	112	46.5			02.6	253	14.4			14.3	320	49.2			56.7	Menkent	147	59.2	S	36	29.2
	22	311	47.5	179	07.5			14.6	127	47.5			03.3	268	16.9			14.3	335	51.9			56.8	Miaplacidus	221	39.4	S	69	48.6
	23	326	49.9	194	10.0			15.0	142	48.5			04.0	283	19.3			14.3	350	54.5			56.9						
S U N D A Y	00	341	52.4	209	12.5	N	10	15.3	157	49.5	S	1	04.6	298	21.8	N	15	14.3	5	57.2	S	11	57.0	Mirfak	308	29.7	N	49	56.5
	01	356	54.9	224	14.9			15.6	172	50.5			05.3	313	24.2			14.3	20	59.8			57.0	Nunki	75	48.9	S	26	16.1
	02	11	57.3	239	17.4			16.0	187	51.5			05.9	328	26.7			14.3	36	02.4			57.1	Peacock	53	07.0	S	56	39.6
	03	26	59.8	254	19.9			16.3	202	52.5			06.6	343	29.1			14.3	51	05.1			57.2	Pollux	243	18.9	N	27	58.2
	04	42	02.2	269	22.3			16.6	217	53.5			07.3	358	31.6			14.3	66	07.7			57.2	Procyon	244	52.2	N	5	10.0
	05	57	04.7	284	24.8			16.9	232	54.5			07.9	13	34.0			14.2	81	10.4			57.3						
	06	72	07.2	299	27.3	N	10	17.3	247	55.5	S	1	08.6	28	36.5	N	15	14.2	96	13.0	S	11	57.4	Rasalhague	95	59.5	N	12	32.7
	07	87	09.6	314	29.7			17.6	262	56.5			09.2	43	38.9			14.2	111	15.6			57.4	Regulus	207	36.0	N	11	51.3
	08	102	12.1	329	32.2			17.9	277	57.4			09.9	58	41.4			14.2	126	18.3			57.5	Rigel	281	05.0	S	8	10.3
	09	117	14.6	344	34.6			18.2	292	58.4			10.6	73	43.8			14.2	141	20.9			57.6	Rigel Kent.	139	42.2	S	60	56.1
	10	132	17.0	359																									

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	1	2	3	4
d h	° /	° /	° /	° /	° /	° /	°	h m	h m	h m	h m	h m	h m	h m	h m
F R I D A Y	100	179 56.4	N 8 26.9	346 28.0	9.8 S	5 59.0	17.5 61.1	N 72	////	02 36	04 05	19 39	19 02	18 16	16 34
	01	194 56.6	26.0	0 56.8	9.9	5 41.5	17.5 61.1	N 70	////	03 03	04 18	19 39	19 10	18 37	17 43
	02	209 56.8	25.1	15 25.7	9.9	5 24.0	17.6 61.1	68	01 37	03 23	04 29	19 38	19 18	18 54	18 21
	03	224 57.0	24.2	29 54.6	10.0	5 06.4	17.5 61.0	66	02 14	03 39	04 37	19 38	19 24	19 08	18 47
	04	239 57.2	23.3	44 23.6	10.0	4 48.9	17.6 61.0	64	02 39	03 52	04 45	19 38	19 29	19 19	19 08
	05	254 57.4	22.4	58 52.6	10.0	4 31.3	17.6 61.0	62	02 58	04 03	04 51	19 38	19 33	19 29	19 25
	06	269 57.6	N 8 21.5	73 21.6	10.1 S	4 13.7	17.6 61.0	60	03 13	04 12	04 56	19 37	19 37	19 37	19 39
	07	284 57.8	20.6	87 50.7	10.2	3 56.1	17.6 61.0	N 58	03 26	04 19	05 01	19 37	19 41	19 45	19 51
	08	299 58.0	19.7	102 19.9	10.2	3 38.5	17.6 60.9	56	03 37	04 26	05 06	19 37	19 44	19 52	20 01
	09	314 58.2	18.8	116 49.1	10.3	3 20.9	17.6 60.9	54	03 46	04 32	05 09	19 37	19 47	19 58	20 11
	10	329 58.4	17.9	131 18.4	10.3	3 03.3	17.6 60.9	52	03 54	04 37	05 13	19 37	19 49	20 03	20 19
	11	344 58.6	17.0	145 47.7	10.3	2 45.7	17.6 60.9	50	04 01	04 42	05 16	19 37	19 52	20 08	20 27
	12	359 58.8	N 8 16.1	160 17.0	10.4 S	2 28.1	17.6 60.8	45	04 16	04 52	05 23	19 36	19 57	20 19	20 43
	13	14 59.0	15.2	174 46.4	10.4	2 10.5	17.6 60.8	N 40	04 27	05 01	05 28	19 36	20 01	20 27	20 56
	14	29 59.2	14.3	189 15.8	10.5	1 52.9	17.7 60.8	35	04 37	05 07	05 33	19 36	20 05	20 35	21 08
	15	44 59.4	13.4	203 45.3	10.5	1 35.2	17.6 60.8	30	04 44	05 13	05 37	19 36	20 08	20 42	21 18
	16	59 59.6	12.4	218 14.8	10.5	1 17.6	17.6 60.7	20	04 56	05 22	05 45	19 35	20 14	20 54	21 35
	17	74 59.8	11.5	232 44.3	10.6	1 00.0	17.5 60.7	N 10	05 05	05 30	05 51	19 35	20 20	21 04	21 50
	18	90 00.0	N 8 10.6	247 13.9	10.6 S	0 42.5	17.6 60.7	0	05 11	05 36	05 56	19 35	20 25	21 14	22 05
	19	105 00.2	09.7	261 43.5	10.7	0 24.9	17.6 60.7	S 10	05 16	05 41	06 02	19 35	20 30	21 24	22 19
	20	120 00.4	08.8	276 13.2	10.7 S	0 07.3	17.5 60.6	20	05 20	05 46	06 08	19 35	20 35	21 35	22 35
	21	135 00.6	07.9	290 42.9	10.7 N	0 10.2	17.5 60.6	30	05 23	05 51	06 15	19 34	20 41	21 47	22 53
	22	150 00.8	07.0	305 12.6	10.7	0 27.7	17.5 60.6	35	05 24	05 53	06 18	19 34	20 45	21 55	23 03
	23	165 01.0	06.1	319 42.3	10.8	0 45.2	17.5 60.5	40	05 24	05 55	06 22	19 34	20 49	22 03	23 15
	S A T U R D A Y	200	180 01.2	N 8 05.2	334 12.1	10.8 N	1 02.7	17.5 60.5	45	05 24	05 58	06 27	19 34	20 54	22 13
01		195 01.4	04.3	348 41.9	10.8	1 20.2	17.4 60.5	S 50	05 23	06 01	06 33	19 34	21 00	22 24	23 48
02		210 01.6	03.4	3 11.7	10.9	1 37.6	17.4 60.5	52	05 23	06 02	06 36	19 34	21 03	22 30	23 56
03		225 01.8	02.5	17 41.6	10.8	1 55.0	17.4 60.4	54	05 22	06 03	06 39	19 34	21 06	22 36	24 05
04		240 02.0	01.5	32 11.4	10.9	2 12.4	17.4 60.4	56	05 21	06 04	06 42	19 34	21 09	22 43	24 16
05		255 02.2	8 00.6	46 41.3	10.9	2 29.8	17.3 60.4	58	05 20	06 06	06 45	19 34	21 13	22 51	24 28
06		270 02.4	N 7 59.7	61 11.2	11.0 N	2 47.1	17.3 60.3	S 60	05 19	06 07	06 49	19 34	21 17	22 59	24 43
07		285 02.6	58.8	75 41.2	10.9	3 04.4	17.2 60.3	Lat.	Sunset	Twilight		Moonset			
08		300 02.8	57.9	90 11.1	11.0	3 21.6	17.2 60.3			Civil	Naut.	1	2	3	4
09		315 03.0	57.0	104 41.1	11.0	3 38.8	17.2 60.2	N 72	h m	h m	h m	h m	h m	h m	h m
10		330 03.2	56.1	119 11.1	11.0	3 56.0	17.1 60.2		19 51	21 18	////	06 13	08 43	11 16	14 44
11		345 03.4	55.2	133 41.1	11.0	4 13.1	17.1 60.2	N 70	19 39	20 52	23 22	06 19	08 38	10 57	13 37
12		0 03.6	N 7 54.3	148 11.1	11.1 N	4 30.2	17.1 60.1	68	19 28	20 33	22 15	06 25	08 34	10 43	13 01
13		15 03.8	53.4	162 41.2	11.0	4 47.3	17.0 60.1	66	19 20	20 18	21 41	06 29	08 30	10 31	12 36
14		30 04.0	52.4	177 11.2	11.1	5 04.3	16.9 60.1	64	19 13	20 05	21 17	06 33	08 27	10 21	12 17
15		45 04.2	51.5	191 41.3	11.0	5 21.2	16.9 60.0	62	19 07	19 55	20 58	06 36	08 25	10 13	12 01
16		60 04.4	50.6	206 11.3	11.1	5 38.1	16.9 60.0	60	19 02	19 46	20 44	06 38	08 23	10 05	11 48
17		75 04.6	49.7	220 41.4	11.1	5 55.0	16.8 60.0	N 58	18 57	19 38	20 31	06 41	08 21	09 59	11 37
18		90 04.8	N 7 48.8	235 11.5	11.1 N	6 11.8	16.7 59.9	56	18 53	19 32	20 21	06 43	08 19	09 54	11 27
19		105 05.0	47.9	249 41.6	11.0	6 28.5	16.7 59.9	54	18 49	19 26	20 12	06 45	08 18	09 49	11 19
20		120 05.2	47.0	264 11.6	11.1	6 45.2	16.6 59.9	52	18 46	19 21	20 04	06 46	08 16	09 44	11 11
21		135 05.4	46.1	278 41.7	11.1	7 01.8	16.6 59.8	50	18 43	19 16	19 57	06 48	08 15	09 40	11 04
22		150 05.6	45.1	293 11.8	11.1	7 18.4	16.5 59.8	45	18 36	19 06	19 42	06 51	08 12	09 32	10 50
23		165 05.8	44.2	307 41.9	11.1	7 34.9	16.5 59.8	N 40	18 31	18 58	19 31	06 54	08 10	09 25	10 38
300		180 06.0	N 7 43.3	322 12.0	11.1 N	7 51.4	16.4 59.7		35	18 26	18 52	19 22	06 57	08 08	09 18
01	195 06.2	42.4	336 42.1	11.1	8 07.8	16.3 59.7	30	18 22	18 46	19 15	06 59	08 07	09 13	10 19	
02	210 06.4	41.5	351 12.2	11.1	8 24.1	16.3 59.6	20	18 15	18 37	19 03	07 02	08 04	09 04	10 04	
03	225 06.6	40.6	5 42.3	11.1	8 40.4	16.2 59.6	N 10	18 09	18 30	18 55	07 05	08 01	08 56	09 50	
04	240 06.8	39.7	20 12.4	11.1	8 56.6	16.1 59.6	0	18 03	18 24	18 48	07 08	07 59	08 48	09 38	
05	255 07.0	38.7	34 42.5	11.1	9 12.7	16.1 59.5	S 10	17 58	18 19	18 43	07 11	07 56	08 41	09 26	
06	270 07.2	N 7 37.8	49 12.6	11.1 N	9 28.8	16.0 59.5	20	17 52	18 14	18 40	07 14	07 53	08 33	09 13	
07	285 07.4	36.9	63 42.7	11.0	9 44.8	15.9 59.5	30	17 45	18 09	18 37	07 17	07 51	08 24	08 58	
08	300 07.6	36.0	78 12.7	11.1	10 00.7	15.9 59.4	35	17 42	18 07	18 37	07 19	07 49	08 18	08 49	
09	315 07.8	35.1	92 42.8	11.0	10 16.6	15.7 59.4	40	17 38	18 05	18 36	07 21	07 47	08 12	08 40	
10	330 08.1	34.2	107 12.8	11.1	10 32.3	15.7 59.3	45	17 33	18 02	18 36	07 24	07 45	08 06	08 28	
11	345 08.3	33.2	121 42.9	11.0	10 48.0	15.7 59.3	S 50	17 27	18 00	18 37	07 27	07 42	07 58	08 15	
12	0 08.5	N 7 32.3	136 12.9	11.0 N	11 03.7	15.5 59.3	52	17 25	17 59	18 38	07 28	07 41	07 54	08 09	
13	15 08.7	31.4	150 42.9	11.0	11 19.2	15.5 59.2	54	17 22	17 58	18 38	07 29	07 39	07 50	08 02	
14	30 08.9	30.5	165 12.9	11.0	11 34.7	15.3 59.2	56	17 19	17 56	18 39	07 31	07 38	07 45	07 54	
15	45 09.1	29.6	179 42.9	10.9	11 50.0	15.3 59.1	58	17 15	17 55	18 40	07 33	07 36	07 40	07 45	
16	60 09.3	28.7	194 12.8	11.0	12 05.3	15.2 59.1	S 60	17 12	17 54	18 42	07 35	07 35	07 35	07 35	
17	75 09.5	27.7	208 42.8	10.9	12 20.5	15.2 59.1	Day	SUN		MOON					
18	90 09.7	N 7 26.8	223 12.7	11.0 N	12 35.7	15.0 59.0		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
19	105 09.9	25.9	237 42.7	10.9	12 50.7	14.9 59.0	00 ^h	12 ^h	Pass.	Upper	Lower	d	%		
20	120 10.1	25.0	252 12.6	10.8	13 05.6	14.9 59.0	1	00 15	00 05	12 00	00 56	13 22	16 97		
21	135 10.3	24.1	266 42.4	10.9	13 20.5	14.8 58.9	2	00 04	00 14	12 00	01 47	14 12	17 91		
22	150 10.5	23.2	281 12.3	10.8	13 35.3										

UT		ARIES			VENUS -4.7			MARS +1.7			JUPITER -2.6			SATURN +0.4			STARS							
		GHA		GHA	Dec	GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	Name	SHA	Dec				
		° /		° /	° /	° /		° /	° /		° /	° /		° /	° /		° /		° /	° /				
MONDAY	400	342	51.5	210	10.8	N10	23.1	158	13.3	S 1	20.5	299	20.6	N15	14.1	7	00.5	S11	58.6	Acamar	315	12.4	S40	12.3
	01	357	54.0	225	13.1		23.4	173	14.3		21.2	314	23.1		14.1	22	03.2		58.7	Achernar	335	20.6	S57	06.8
	02	12	56.5	240	15.5		23.7	188	15.3		21.8	329	25.6		14.1	37	05.8		58.8	Acrux	173	02.0	S63	13.8
	03	27	58.9	255	17.9		24.0	203	16.3		22.5	344	28.0		14.1	52	08.5		58.8	Adhara	255	06.9	S28	59.9
	04	43	01.4	270	20.2		24.3	218	17.3		23.1	359	30.5		14.1	67	11.1		58.9	Aldebaran	290	40.9	N16	33.4
	05	58	03.8	285	22.6		24.6	233	18.3		23.8	14	32.9		14.1	82	13.7		59.0					
	06	73	06.3	300	25.0	N10	24.9	248	19.3	S 1	24.5	29	35.4	N15	14.1	97	16.4	S11	59.0	Alioth	166	14.4	N55	50.1
	07	88	08.8	315	27.3		25.2	263	20.2		25.1	44	37.8		14.1	112	19.0		59.1	Alkaid	152	53.2	N49	12.0
	08	103	11.2	330	29.7		25.6	278	21.2		25.8	59	40.3		14.1	127	21.7		59.2	Alnair	27	33.8	S46	50.8
	09	118	13.7	345	32.0		25.9	293	22.2		26.4	74	42.8		14.1	142	24.3		59.2	Alnilam	275	38.9	S 1	11.0
	10	133	16.2	0	34.4		26.2	308	23.2		27.1	89	45.2		14.1	157	27.0		59.3	Alphard	217	49.2	S 8	45.5
	11	148	18.6	15	36.7		26.5	323	24.2		27.8	104	47.7		14.1	172	29.6		59.4					
	12	163	21.1	30	39.0	N10	26.8	338	25.2	S 1	28.4	119	50.1	N15	14.1	187	32.2	S11	59.4	Alphecca	126	04.8	N26	38.3
	13	178	23.6	45	41.3		27.1	353	26.2		29.1	134	52.6		14.1	202	34.9		59.5	Alpheratz	357	35.6	N29	13.3
	14	193	26.0	60	43.7		27.4	8	27.2		29.7	149	55.1		14.1	217	37.5		59.6	Altair	62	00.8	N 8	56.0
	15	208	28.5	75	46.0		27.7	23	28.2		30.4	164	57.5		14.0	232	40.2		59.7	Ankaa	353	07.8	S42	10.5
	16	223	31.0	90	48.3		28.0	38	29.2		31.1	180	00.0		14.0	247	42.8		59.7	Antares	112	17.2	S26	29.1
	17	238	33.4	105	50.6		28.3	53	30.1		31.7	195	02.5		14.0	262	45.4		59.8					
	18	253	35.9	120	52.9	N10	28.6	68	31.1	S 1	32.4	210	04.9	N15	14.0	277	48.1	S11	59.9	Arcturus	145	49.1	N19	03.8
	19	268	38.3	135	55.2		28.9	83	32.1		33.1	225	07.4		14.0	292	50.7	11	59.9	Atria	107	12.4	S69	04.4
	20	283	40.8	150	57.5		29.2	98	33.1		33.7	240	09.8		14.0	307	53.4	12	00.0	Avior	234	15.7	S59	34.8
	21	298	43.3	165	59.8		29.5	113	34.1		34.4	255	12.3		14.0	322	56.0		00.1	Bellatrix	278	24.1	N 6	22.4
	22	313	45.7	181	02.1		29.8	128	35.1		35.0	270	14.8		14.0	337	58.6		00.1	Betelgeuse	270	53.4	N 7	24.8
	23	328	48.2	196	04.4		30.1	143	36.1		35.7	285	17.2		14.0	353	01.3		00.2					
TUESDAY	500	343	50.7	211	06.7	N10	30.4	158	37.1	S 1	36.4	300	19.7	N15	14.0	8	03.9	S12	00.3	Canopus	263	53.1	S52	42.1
	01	358	53.1	226	09.0		30.7	173	38.0		37.0	315	22.2		14.0	23	06.6		00.3	Capella	280	23.6	N46	01.2
	02	13	55.6	241	11.2		31.0	188	39.0		37.7	330	24.6		14.0	38	09.2		00.4	Deneb	49	26.2	N45	22.0
	03	28	58.1	256	13.5		31.3	203	40.0		38.3	345	27.1		13.9	53	11.8		00.5	Denebola	182	26.4	N14	26.6
	04	44	00.5	271	15.8		31.6	218	41.0		39.0	0	29.6		13.9	68	14.5		00.6	Diphda	348	48.1	S17	51.3
	05	59	03.0	286	18.0		31.9	233	42.0		39.7	15	32.0		13.9	83	17.1		00.6					
	06	74	05.4	301	20.3	N10	32.2	248	43.0	S 1	40.3	30	34.5	N15	13.9	98	19.8	S12	00.7	Dubhe	193	43.0	N61	37.5
	07	89	07.9	316	22.6		32.5	263	44.0		41.0	45	37.0		13.9	113	22.4		00.8	Elnath	278	03.3	N28	37.6
	08	104	10.4	331	24.8		32.8	278	45.0		41.7	60	39.4		13.9	128	25.0		00.8	Eltanin	90	42.5	N51	29.4
	09	119	12.8	346	27.1		33.1	293	46.0		42.3	75	41.9		13.9	143	27.7		00.9	Enif	33	39.6	N 9	59.1
	10	134	15.3	1	29.3		33.4	308	46.9		43.0	90	44.4		13.9	158	30.3		01.0	Fomalhaut	15	15.4	S29	29.7
	11	149	17.8	16	31.5		33.7	323	47.9		43.6	105	46.8		13.9	173	33.0		01.0					
	12	164	20.2	31	33.8	N10	34.0	338	48.9	S 1	44.3	120	49.3	N15	13.9	188	35.6	S12	01.1	Gacrux	171	53.5	S57	14.7
	13	179	22.7	46	36.0		34.3	353	49.9		45.0	135	51.8		13.9	203	38.2		01.2	Gienah	175	45.1	S17	40.3
	14	194	25.2	61	38.2		34.6	8	50.9		45.6	150	54.3		13.8	218	40.9		01.2	Hadar	148	38.0	S60	29.3
	15	209	27.6	76	40.5		34.9	23	51.9		46.3	165	56.7		13.8	233	43.5		01.3	Hamal	327	52.2	N23	34.5
	16	224	30.1	91	42.7		35.1	38	52.9		47.0	180	59.2		13.8	248	46.2		01.4	Kaus Aust.	83	33.8	S34	22.5
	17	239	32.6	106	44.9		35.4	53	53.9		47.6	196	01.7		13.8	263	48.8		01.4					
	18	254	35.0	121	47.1	N10	35.7	68	54.8	S 1	48.3	211	04.1	N15	13.8	278	51.4	S12	01.5	Kochab	137	20.3	N74	03.8
	19	269	37.5	136	49.3		36.0	83	55.8		48.9	226	06.6		13.8	293	54.1		01.6	Markab	13	30.7	N15	20.0
	20	284	39.9	151	51.5		36.3	98	56.8		49.6	241	09.1		13.8	308	56.7		01.6	Menkar	314	07.2	N 4	11.1
	21	299	42.4	166	53.7		36.6	113	57.8		50.3	256	11.6		13.8	323	59.4		01.7	Menkent	147	59.2	S36	29.2
	22	314	44.9	181	55.9		36.9	128	58.8		50.9	271	14.0		13.8	339	02.0		01.8	Miaplacidus	221	39.4	S69	48.6
	23	329	47.3	196	58.1		37.2	143	59.8		51.6	286	16.5		13.7	354	04.6		01.9					
WEDNESDAY	600	344	49.8	212	00.3	N10	37.4	159	00.8	S 1	52.2	301	19.0	N15	13.7	9	07.3	S12	01.9	Mirfak	308	29.7	N49	56.5
	01	359	52.3	227	02.5		37.7	174	01.7		52.9	316	21.4		13.7	24	09.9		02.0	Nunki	75	49.0	S26	16.1
	02	14	54.7	242	04.6		38.0	189	02.7		53.6	331	23.9		13.7	39	12.6		02.1	Peacock	53	07.0	S56	39.6
	03	29	57.2	257	06.8		38.3	204	03.7		54.2	346	26.4		13.7	54	15.2		02.1	Pollux	243	18.9	N27	58.2
	04	44	59.7	272	09.0		38.6	219	04.7		54.9	1	28.9		13.7	69	17.8		02.2	Procyon	244	52.2	N 5	10.0
	05	60	02.1	287	11.2		38.8	234	05.7		55.6	16	31.3		13.7	84	20.5		02.3					
	06	75	04.6	302	13.3	N10	39.1	249	06.7	S 1	56.2	31	33.8	N15	13.7	99	23.1	S12	02.3	Rasalhague	95	59.5	N12	32.7
	07	90	07.1	317	15.5		39.4	264	07.7		56.9	46	36.3		13.7	114	25.8		02.4	Regulus	207	35.9	N11	51.3
	08	105	09.5	332	17.6		39.7	279	08.6		57.5	61	38.8		13.6	129	28.4		02.5	Rigel	281	05.0	S 8	10.3
	09	120	12.0	347	19.8		40.0	294	09.6		58.2	76	41.2		13.6	144	31.0		02.5	Rigel Kent.	139	42.2	S60	56

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
										Naut.	Civil		4	5	6	7				
	GHA	Dec	GHA	ν	Dec	d	HP	h									m	h	m	h
MONDAY	d	h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m
	00	180	10.9	N 7	21.3	310	12.0	10.7	N14	04.5	14.5	58.8	N 72	01 13	03 19	04 31	17 43			
	01	195	11.1		20.4	324	41.7	10.8	14	19.0	14.4	58.8	N 70	02 01	03 37	04 40	18 21			
	02	210	11.3		19.5	339	11.5	10.8	14	33.4	14.3	58.7	66	02 31	03 50	04 47	18 47	18 10		
	03	225	11.5		18.6	353	41.3	10.7	14	47.7	14.2	58.7	64	02 52	04 02	04 53	19 08	18 52	18 09	
	04	240	11.8		17.6	8	11.0	10.7	15	01.9	14.1	58.6	62	03 09	04 11	04 59	19 25	19 20	19 15	19 09
	05	255	12.0		16.7	22	40.7	10.7	15	16.0	14.0	58.6	60	03 23	04 19	05 04	19 39	19 42	19 51	20 11
	06	270	12.2	N 7	15.8	37	10.4	10.6	N15	30.0	14.0	58.5	N 58	03 34	04 26	05 08	19 51	20 00	20 16	20 45
	07	285	12.4		14.9	51	40.0	10.6	15	44.0	13.8	58.5	56	03 44	04 32	05 11	20 01	20 15	20 37	21 10
	08	300	12.6		14.0	66	09.6	10.6	15	57.8	13.7	58.5	54	03 53	04 38	05 15	20 11	20 28	20 54	21 30
	09	315	12.8		13.0	80	39.2	10.6	16	11.5	13.6	58.4	52	04 00	04 43	05 18	20 19	20 40	21 08	21 47
	10	330	13.0		12.1	95	08.8	10.5	16	25.1	13.4	58.4	50	04 07	04 47	05 20	20 27	20 50	21 21	22 01
	11	345	13.2		11.2	109	38.3	10.5	16	38.5	13.4	58.3	45	04 20	04 56	05 26	20 43	21 12	21 47	22 31
	12	0	13.4	N 7	10.3	124	07.8	10.5	N16	51.9	13.3	58.3	N 40	04 31	05 04	05 31	20 56	21 29	22 08	22 54
	13	15	13.6		09.3	138	37.3	10.5	17	05.2	13.2	58.3	35	04 39	05 10	05 35	21 08	21 44	22 26	23 13
	14	30	13.8		08.4	153	06.8	10.4	17	18.4	13.0	58.2	30	04 46	05 15	05 39	21 18	21 57	22 41	23 29
	15	45	14.0		07.5	167	36.2	10.4	17	31.4	13.0	58.2	20	04 57	05 23	05 45	21 35	22 19	23 06	23 57
	16	60	14.2		06.6	182	05.6	10.3	17	44.4	12.8	58.1	N 10	05 05	05 29	05 51	21 50	22 38	23 29	24 21
	17	75	14.4		05.7	196	34.9	10.3	17	57.2	12.8	58.1	0	05 11	05 35	05 56	22 05	22 56	23 50	24 43
	18	90	14.7	N 7	04.7	211	04.2	10.3	N18	10.0	12.6	58.1	S 10	05 15	05 39	06 00	22 19	23 15	24 10	00 10
	19	105	14.9		03.8	225	33.5	10.3	18	22.6	12.5	58.0	20	05 18	05 43	06 05	22 35	23 34	24 33	00 33
	20	120	15.1		02.9	240	02.8	10.2	18	35.1	12.4	58.0	30	05 19	05 47	06 11	22 53	23 57	24 59	00 59
	21	135	15.3		02.0	254	32.0	10.2	18	47.5	12.2	57.9	35	05 20	05 49	06 14	23 03	24 10	00 10	01 15
	22	150	15.5		01.0	269	01.2	10.2	18	59.7	12.2	57.9	40	05 19	05 51	06 18	23 15	24 26	00 26	01 33
	23	165	15.7	7	00.1	283	30.4	10.1	19	11.9	12.0	57.9	45	05 19	05 52	06 22	23 30	24 45	00 45	01 55
TUESDAY	5 00	180	15.9	N 6	59.2	297	59.5	10.1	N19	23.9	12.0	57.8	S 50	05 17	05 54	06 27	23 48	25 08	01 08	02 23
	01	195	16.1		58.3	312	28.6	10.0	19	35.9	11.8	57.8	52	05 16	05 55	06 29	23 56	25 19	01 19	02 36
	02	210	16.3		57.3	326	57.6	10.1	19	47.7	11.6	57.7	54	05 15	05 56	06 31	24 05	00 05	01 32	02 52
	03	225	16.5		56.4	341	26.7	10.0	19	59.3	11.6	57.7	56	05 14	05 57	06 34	24 16	00 16	01 47	03 11
	04	240	16.7		55.5	355	55.7	9.9	20	10.9	11.4	57.7	58	05 12	05 58	06 37	24 28	00 28	02 05	03 34
	05	255	16.9		54.6	10	24.6	9.9	20	22.3	11.3	57.6	S 60	05 11	05 59	06 40	24 43	00 43	02 26	04 05
	06	270	17.2	N 6	53.6	24	53.5	9.9	N20	33.6	11.2	57.6	Lat.	Sunset	Twilight		Moonset			
	07	285	17.4		52.7	39	22.4	9.9	20	44.8	11.1	57.5			Civil	Naut.	4	5	6	7
	08	300	17.6		51.8	53	51.3	9.8	20	55.9	10.9	57.5	°	h m	h m	h m	h m	h m	h m	h m
	09	315	17.8		50.9	68	20.1	9.8	21	06.8	10.9	57.5								
	10	330	18.0		49.9	82	48.9	9.7	21	17.7	10.6	57.4	N 70	19 24	20 35	22 33	13 37			
	11	345	18.2		49.0	97	17.6	9.7	21	28.3	10.6	57.4	68	19 16	20 18	21 50	13 01			
	12	0	18.4	N 6	48.1	111	46.3	9.7	N21	38.9	10.4	57.4	66	19 16	20 18	21 50	13 01			
	13	15	18.6		47.2	126	15.0	9.6	21	49.3	10.3	57.3	64	19 08	20 04	21 23	12 36	15 01		
	14	30	18.8		46.2	140	43.6	9.6	21	59.6	10.2	57.3	62	19 02	19 53	21 02	12 17	14 20	16 54	
	15	45	19.0		45.3	155	12.2	9.6	22	09.8	10.0	57.2	60	18 57	19 44	20 46	12 01	13 52	15 47	17 46
	16	60	19.2		44.4	169	40.8	9.5	22	19.8	10.0	57.2	60	18 52	19 36	20 32	11 48	13 31	15 13	16 44
	17	75	19.5		43.5	184	09.3	9.6	22	29.8	9.7	57.2	N 58	18 48	19 30	20 21	11 37	13 14	14 48	16 10
	18	90	19.7	N 6	42.5	198	37.9	9.4	N22	39.5	9.7	57.1	56	18 45	19 24	20 12	11 27	12 59	14 28	15 45
	19	105	19.9		41.6	213	06.3	9.5	22	49.2	9.5	57.1	54	18 42	19 18	20 03	11 19	12 47	14 11	15 26
	20	120	20.1		40.7	227	34.8	9.4	22	58.7	9.4	57.0	52	18 39	19 14	19 56	11 11	12 36	13 57	15 09
	21	135	20.3		39.7	242	03.2	9.3	23	08.1	9.2	57.0	50	18 36	19 09	19 50	11 04	12 26	13 44	14 55
	22	150	20.5		38.8	256	31.5	9.4	23	17.3	9.1	57.0	45	18 30	19 00	19 36	10 50	12 06	13 19	14 25
	23	165	20.7		37.9	270	59.9	9.3	23	26.4	9.0	56.9	N 40	18 26	18 53	19 26	10 38	11 49	12 59	14 03
WEDNESDAY	6 00	180	20.9	N 6	37.0	285	28.2	9.3	N23	35.4	8.8	56.9	35	18 22	18 47	19 18	10 28	11 36	12 42	13 44
	01	195	21.1		36.0	299	56.5	9.2	23	44.2	8.7	56.9	30	18 18	18 42	19 11	10 19	11 24	12 27	13 28
	02	210	21.4		35.1	314	24.7	9.2	23	52.9	8.6	56.8	20	18 12	18 34	19 00	10 04	11 03	12 03	13 01
	03	225	21.6		34.2	328	52.9	9.2	24	01.5	8.4	56.8	N 10	18 07	18 28	18 53	09 50	10 46	11 41	12 37
	04	240	21.8		33.2	343	21.1	9.2	24	09.9	8.3	56.7	0	18 02	18 23	18 47	09 38	10 29	11 22	12 15
	05	255	22.0		32.3	357	49.3	9.1	24	18.2	8.2	56.7	S 10	17 57	18 18	18 43	09 26	10 13	11 02	11 54
	06	270	22.2	N 6	31.4	12	17.4	9.1	N24	26.4	8.0	56.7	20	17 52	18 15	18 40	09 13	09 55	10 41	11 30
	07	285	22.4		30.5	26	45.5	9.0	24	34.4	7.8	56.6	30	17 47	18 11	18 39	08 58	09 35	10 17	11 03
	08	300	22.6		29.5	41	13.5	9.1	24	42.2	7.8	56.6	35	17 44	18 09	18 39	08 49	09 24	10 03	10 47
	09	315	22.8		28.6	55	41.6	9.0	24	50.0	7.5	56.6	40	17 40	18 08	18 39	08 40	09 10	09 46	10 29
	10	330	23.0		27.7	70	09.6	9.0	24	57.5	7.5	56.5	45	17 36	18 06	18 40	08 28	08 55	09 27	10 06
	11	345	23.3		26.7	84	37.6	8.9	25	05.0	7.3	56.5	S 50	17 32	18 04	18 41	08 15	08 36	09 02	09 38
	12	0	23.5	N 6	25.8	99	05.5	9.0	N25	12.3	7.2	56.5	52	17 30	18 03	18 42	08 09	08 27	08 51	09 24
	13	15	23.7		24.9	113	33.5	8.9	25	19.5	7.0	56.4	54	17 27	18 03	18 44	08 02	08 17	08 37	09 08
	14																			

UT	ARIES		VENUS -4.8		MARS +1.7		JUPITER -2.6		SATURN +0.4		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
T H U R S D A Y	7 00	345 48.9	212 51.6 N10	44.0	159 24.4 S	2 08.1	302 18.4 N15	13.4	10 10.6 S12	03.6	Acamar	315 12.4 S40	12.3
	01	0 51.4	227 53.7	44.3	174 25.4	08.8	317 20.9	13.4	25 13.3	03.6	Achernar	335 20.5 S57	06.8
	02	15 53.9	242 55.8	44.6	189 26.4	09.5	332 23.4	13.4	40 15.9	03.7	Acrux	173 02.0 S63	13.8
	03	30 56.3	257 57.8	44.8	204 27.4	10.1	347 25.9	13.4	55 18.5	03.8	Adhara	255 06.9 S28	59.9
	04	45 58.8	272 59.9	45.1	219 28.3	10.8	2 28.4	13.4	70 21.2	03.8	Aldebaran	290 40.9 N16	33.5
	05	61 01.3	288 02.0	45.3	234 29.3	11.4	17 30.8	13.4	85 23.8	03.9			
	06	76 03.7	303 04.1 N10	45.6	249 30.3 S	2 12.1	32 33.3 N15	13.4	100 26.5 S12	04.0	Alioth	166 14.4 N55	50.1
	07	91 06.2	318 06.1	45.9	264 31.3	12.8	47 35.8	13.4	115 29.1	04.0	Alkaid	152 53.2 N49	12.0
	08	106 08.7	333 08.2	46.1	279 32.3	13.4	62 38.3	13.3	130 31.7	04.1	Alnair	27 33.8 S46	50.8
	09	121 11.1	348 10.3	46.4	294 33.3	14.1	77 40.8	13.3	145 34.4	04.2	Alnilam	275 38.9 S	1 11.0
	10	136 13.6	3 12.3	46.6	309 34.2	14.7	92 43.3	13.3	160 37.0	04.2	Alphard	217 49.1 S	8 45.5
	11	151 16.0	18 14.4	46.9	324 35.2	15.4	107 45.8	13.3	175 39.6	04.3			
	12	166 18.5	33 16.4 N10	47.2	339 36.2 S	2 16.1	122 48.2 N15	13.3	190 42.3 S12	04.4	Alphecca	126 04.8 N26	38.3
	13	181 21.0	48 18.5	47.4	354 37.2	16.7	137 50.7	13.3	205 44.9	04.4	Alpheratz	357 35.6 N29	13.3
	14	196 23.4	63 20.5	47.7	9 38.2	17.4	152 53.2	13.3	220 47.6	04.5	Altair	62 00.8 N	8 56.0
	15	211 25.9	78 22.5	47.9	24 39.1	18.1	167 55.7	13.2	235 50.2	04.6	Ankaa	353 07.8 S42	10.5
	16	226 28.4	93 24.6	48.2	39 40.1	18.7	182 58.2	13.2	250 52.8	04.6	Antares	112 17.2 S26	29.1
	17	241 30.8	108 26.6	48.4	54 41.1	19.4	198 00.7	13.2	265 55.5	04.7			
	18	256 33.3	123 28.6 N10	48.7	69 42.1 S	2 20.0	213 03.2 N15	13.2	280 58.1 S12	04.8	Arcturus	145 49.1 N19	03.8
	19	271 35.8	138 30.6	48.9	84 43.1	20.7	228 05.6	13.2	296 00.8	04.8	Atria	107 12.5 S69	04.4
	20	286 38.2	153 32.6	49.2	99 44.1	21.4	243 08.1	13.2	311 03.4	04.9	Avior	234 15.7 S59	34.8
	21	301 40.7	168 34.7	49.4	114 45.0	22.0	258 10.6	13.1	326 06.0	05.0	Bellatrix	278 24.1 N	6 22.4
	22	316 43.2	183 36.7	49.7	129 46.0	22.7	273 13.1	13.1	341 08.7	05.0	Betelgeuse	270 53.4 N	7 24.8
	23	331 45.6	198 38.7	49.9	144 47.0	23.4	288 15.6	13.1	356 11.3	05.1			
F R I D A Y	8 00	346 48.1	213 40.7 N10	50.2	159 48.0 S	2 24.0	303 18.1 N15	13.1	11 13.9 S12	05.2	Canopus	263 53.1 S52	42.1
	01	1 50.5	228 42.7	50.4	174 49.0	24.7	318 20.6	13.1	26 16.6	05.2	Capella	280 23.6 N46	01.2
	02	16 53.0	243 44.7	50.7	189 50.0	25.3	333 23.1	13.1	41 19.2	05.3	Deneb	49 26.2 N45	22.0
	03	31 55.5	258 46.7	50.9	204 50.9	26.0	348 25.6	13.1	56 21.9	05.4	Denebola	182 26.4 N14	26.6
	04	46 57.9	273 48.6	51.2	219 51.9	26.7	3 28.1	13.0	71 24.5	05.4	Diphda	348 48.1 S17	51.3
	05	62 00.4	288 50.6	51.4	234 52.9	27.3	18 30.6	13.0	86 27.1	05.5			
	06	77 02.9	303 52.6 N10	51.7	249 53.9 S	2 28.0	33 33.0 N15	13.0	101 29.8 S12	05.6	Dubhe	193 43.0 N61	37.5
	07	92 05.3	318 54.6	51.9	264 54.9	28.6	48 35.5	13.0	116 32.4	05.6	Elnath	278 03.3 N28	37.6
	08	107 07.8	333 56.5	52.1	279 55.8	29.3	63 38.0	13.0	131 35.0	05.7	Eltanin	90 42.6 N51	29.4
	09	122 10.3	348 58.5	52.4	294 56.8	30.0	78 40.5	13.0	146 37.7	05.8	Enif	33 39.6 N	9 59.1
	10	137 12.7	4 00.5	52.6	309 57.8	30.6	93 43.0	12.9	161 40.3	05.8	Fomalhaut	15 15.4 S29	29.7
	11	152 15.2	19 02.4	52.9	324 58.8	31.3	108 45.5	12.9	176 43.0	05.9			
	12	167 17.7	34 04.4 N10	53.1	339 59.8 S	2 32.0	123 48.0 N15	12.9	191 45.6 S12	06.0	Gacrux	171 53.5 S57	14.7
	13	182 20.1	49 06.3	53.3	355 00.7	32.6	138 50.5	12.9	206 48.2	06.0	Gienah	175 45.0 S17	40.3
	14	197 22.6	64 08.3	53.6	10 01.7	33.3	153 53.0	12.9	221 50.9	06.1	Hadar	148 38.1 S60	29.3
	15	212 25.0	79 10.2	53.8	25 02.7	33.9	168 55.5	12.9	236 53.5	06.2	Hamal	327 52.2 N23	34.5
	16	227 27.5	94 12.2	54.0	40 03.7	34.6	183 58.0	12.8	251 56.1	06.2	Kaus Aust.	83 33.8 S34	22.5
	17	242 30.0	109 14.1	54.3	55 04.7	35.3	199 00.5	12.8	266 58.8	06.3			
	18	257 32.4	124 16.0 N10	54.5	70 05.6 S	2 35.9	214 03.0 N15	12.8	282 01.4 S12	06.4	Kochab	137 20.3 N74	03.7
	19	272 34.9	139 18.0	54.7	85 06.6	36.6	229 05.5	12.8	297 04.1	06.4	Markab	13 30.7 N15	20.0
	20	287 37.4	154 19.9	55.0	100 07.6	37.3	244 08.0	12.8	312 06.7	06.5	Menkar	314 07.2 N	4 11.1
	21	302 39.8	169 21.8	55.2	115 08.6	37.9	259 10.5	12.8	327 09.3	06.6	Menkent	147 59.2 S36	29.2
	22	317 42.3	184 23.7	55.4	130 09.6	38.6	274 13.0	12.7	342 12.0	06.6	Miaplacidus	221 39.4 S69	48.6
	23	332 44.8	199 25.7	55.7	145 10.5	39.2	289 15.5	12.7	357 14.6	06.7			
S A T U R D A Y	9 00	347 47.2	214 27.6 N10	55.9	160 11.5 S	2 39.9	304 18.0 N15	12.7	12 17.2 S12	06.8	Mirfak	308 29.7 N49	56.6
	01	2 49.7	229 29.5	56.1	175 12.5	40.6	319 20.5	12.7	27 19.9	06.8	Nunki	75 49.0 S26	16.1
	02	17 52.1	244 31.4	56.4	190 13.5	41.2	334 23.0	12.7	42 22.5	06.9	Peacock	53 07.0 S56	39.6
	03	32 54.6	259 33.3	56.6	205 14.5	41.9	349 25.5	12.6	57 25.1	07.0	Pollux	243 18.9 N27	58.2
	04	47 57.1	274 35.2	56.8	220 15.4	42.5	4 28.0	12.6	72 27.8	07.0	Procyon	244 52.2 N	5 10.0
	05	62 59.5	289 37.1	57.0	235 16.4	43.2	19 30.5	12.6	87 30.4	07.1			
	06	78 02.0	304 39.0 N10	57.3	250 17.4 S	2 43.9	34 33.0 N15	12.6	102 33.1 S12	07.2	Rasalhague	95 59.5 N12	32.7
	07	93 04.5	319 40.8	57.5	265 18.4	44.5	49 35.5	12.6	117 35.7	07.2	Regulus	207 35.9 N11	51.3
	08	108 06.9	334 42.7	57.7	280 19.3	45.2	64 38.0	12.6	132 38.3	07.3	Rigel	281 05.0 S	8 10.3
	09	123 09.4	349 44.6	57.9	295 20.3	45.9	79 40.5	12.5	147 41.0	07.4	Rigil Kent.	139 42.2 S60	56.1
	10	138 11.9	4 46.5	58.1	310 21.3	46.5	94 43.0	12.5	162 43.6	07.4	Sabik	102 04.0 S15	45.2
	11	153 14.3	19 48.4	58.4	325 22.3	47.2	109 45.5	12.5	177 46.2	07.5			
	12	168 16.8	34 50.2 N10	58.6	340 23.3 S	2 47.8	124 48.0 N15	12.5	192 48.9 S12	07.6	Schedar	349 31.8 N56	40.0
	13	183 19.3	49 52.1	58.8	355 24.2	48.5	139 50.5	12.5	207 51.5	07.6	Shaula	96 11.8 S37	07.3
	14	198 21.7	64 53.9	59.0	10 25.2	49.2	154 53.0	12.4	222 54.1	07.7	Sirius	258 27.4 S16	44.7
	15	213 24.2	79 55.8	59.2	25 26.2	49.8	169 55.5	12.4	237 56.8	07.8	Spica	158 23.7 S11	17.0
	16	228 26.6	94 57.7	59.5	40 27.2	50.5	184 58.0	12.4	252 59.4	07.8	Suhail	222 47.5 S43	31.4
	17	243 29.1	109 59.5	59.7	55 28.1	51.1	200 00.5	12.4	268 02.1	07.9			
	18	258 31.6	125 01.4 N10	59.9	70 29.1 S	2 51.8	215 03.0 N15	12.4	283 04.7 S12	08.0	Vega	80 33.8 N38	48.6
	19	273 34.0	140 03.2	11 00.1	85 30.1	52.5	230 05.5	12.3	298 07.3	08.0	Zuben'ubi	136 57.4 S16	08.3
	20	288 36.5	155 05.0	00.3	100 31.1	53.1	245 08.0	12.3	313 10.0	08.1		SHA	Mer.Pass.
	21	303 39.0	170 06.9	00.5	115 32.1	53.8	260 10.5	12.3	328 12.6	08.2	Venus	226 52.6	h m
	22	318 41.4	185 08.7	00.7	130 33.0	54.5	275 13.0	12.3	343 15.2	08.2	Mars	172 59.9	9 44
	23	333 43.9	200 10.5	00.9	145 34.0	55.1	290 15.5	12.3	358 17.9	08.3	Jupiter	316 30.0	3 46
Mer.Pass. 0 52.7			v 2.0 d 0.2		v 1.0 d 0.7		v 2.5 d 0.0		v 2.6 d 0.1		Saturn	24 25.9	23 11

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	7	8	9	10				
	°	'		°	'																
T H U R S D A Y	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m		
	7 00	180	26.0	N 6	14.6	272	39.3	8.6	N26	28.7	5.4	56.1	N 72	00 26	03 15	04 34					
	01	195	26.2		13.7	287	06.9	8.7	26	34.1	5.3	56.0	N 70	01 45	03 34	04 43					
	02	210	26.4		12.7	301	34.6	8.7	26	39.4	5.1	56.0	66	02 46	04 01	04 57					
	03	225	26.6		11.8	316	02.3	8.6	26	44.5	5.0	56.0	64	03 05	04 11	05 02				22 34	
	04	240	26.9		10.9	330	29.9	8.7	26	49.5	4.8	55.9	62	03 20	04 20	05 07	19 09		21 28	23 16	
	05	255	27.1		09.9	344	57.6	8.6	26	54.3	4.7	55.9	60	03 32	04 27	05 11	20 11	20 58	22 15	23 45	
	06	270	27.3	N 6	09.0	359	25.2	8.6	N26	59.0	4.5	55.9	N 58	03 42	04 33	05 14	20 45	21 34	22 45	24 06	
	07	285	27.5		08.1	13	52.8	8.6	27	03.5	4.4	55.8	56	03 51	04 39	05 17	21 10	22 00	23 07	24 24	
	08	300	27.7		07.1	28	20.4	8.6	27	07.9	4.3	55.8	54	03 59	04 44	05 20	21 30	22 21	23 26	24 39	
	09	315	27.9		06.2	42	48.0	8.6	27	12.2	4.0	55.8	52	04 06	04 48	05 23	21 47	22 39	23 42	24 52	
	10	330	28.1		05.3	57	15.6	8.6	27	16.2	4.0	55.8	50	04 12	04 52	05 25	22 01	22 53	23 55	25 04	
	11	345	28.4		04.3	71	43.2	8.6	27	20.2	3.8	55.7	45	04 24	05 00	05 30	22 31	23 23	24 23	00 23	
	12	0	28.6	N 6	03.4	86	10.8	8.6	N27	24.0	3.6	55.7	N 40	04 34	05 06	05 34	22 54	23 47	24 45	00 45	
	13	15	28.8		02.5	100	38.4	8.6	27	27.6	3.5	55.7	35	04 42	05 12	05 37	23 13	24 06	00 06	01 03	
	14	30	29.0		01.5	115	06.0	8.5	27	31.1	3.4	55.6	30	04 48	05 16	05 41	23 29	24 22	00 22	01 18	
	15	45	29.2	6	00.6	129	33.5	8.6	27	34.5	3.2	55.6	20	04 58	05 24	05 46	23 57	24 50	00 50	01 44	
	16	60	29.4	5	59.7	144	01.1	8.6	27	37.7	3.0	55.6	N 10	05 05	05 29	05 50	24 21	00 21	01 14	02 07	
	17	75	29.6		58.7	158	28.7	8.6	27	40.7	2.9	55.5	0	05 10	05 34	05 54	24 43	00 43	01 36	02 28	
	18	90	29.9	N 5	57.8	172	56.3	8.6	N27	43.6	2.8	55.5	S 10	05 13	05 37	05 59	00 10	01 06	01 59	02 49	
	19	105	30.1		56.8	187	23.9	8.6	27	46.4	2.6	55.5	20	05 15	05 41	06 03	00 33	01 30	02 23	03 11	
	20	120	30.3		55.9	201	51.5	8.6	27	49.0	2.4	55.5	30	05 16	05 43	06 07	00 59	01 58	02 51	03 37	
	21	135	30.5		55.0	216	19.1	8.6	27	51.4	2.4	55.4	35	05 15	05 45	06 10	01 15	02 14	03 07	03 52	
	22	150	30.7		54.0	230	46.7	8.6	27	53.8	2.1	55.4	40	05 15	05 46	06 13	01 33	02 34	03 26	04 10	
	23	165	30.9		53.1	245	14.3	8.6	27	55.9	2.0	55.4	45	05 13	05 47	06 16	01 55	02 57	03 49	04 31	
F R I D A Y	8 00	180	31.1	N 5	52.2	259	41.9	8.7	N27	57.9	1.9	55.4	S 50	05 11	05 48	06 20	02 23	03 27	04 19	04 58	
	01	195	31.4		51.2	274	09.6	8.6	27	59.8	1.7	55.3	52	05 09	05 48	06 22	02 36	03 42	04 34	05 11	
	02	210	31.6		50.3	288	37.2	8.7	28	01.5	1.6	55.3	54	05 08	05 49	06 24	02 52	04 00	04 51	05 26	
	03	225	31.8		49.3	303	04.9	8.6	28	03.1	1.4	55.3	56	05 06	05 49	06 26	03 11	04 21	05 11	05 43	
	04	240	32.0		48.4	317	32.5	8.7	28	04.5	1.3	55.3	58	05 04	05 50	06 29	03 34	04 48	05 37	06 05	
	05	255	32.2		47.5	332	00.2	8.8	28	05.8	1.1	55.2	S 60	05 02	05 50	06 31	04 05	05 26	06 12	06 31	
	06	270	32.4	N 5	46.5	346	28.0	8.7	N28	06.9	1.0	55.2	Lat.	Sunset	Twilight		Moonset				
	07	285	32.6		45.6	0	55.7	8.7	28	07.9	0.8	55.2			Civil	Naut.	7	8	9	10	
	08	300	32.9		44.7	15	23.4	8.8	28	08.7	0.7	55.2	°	h m	h m	h m	h m	h m	h m	h m	h m
	09	315	33.1		43.7	29	51.2	8.8	28	09.4	0.5	55.1									
	10	330	33.3		42.8	44	19.0	8.8	28	09.9	0.4	55.1	N 70	19 10	20 18	22 02					
	11	345	33.5		41.8	58	46.8	8.8	28	10.3	0.3	55.1	68	19 03	20 03	21 29					
	12	0	33.7	N 5	40.9	73	14.6	8.9	N28	10.6	0.1	55.1	66	18 57	19 52	21 06					
	13	15	33.9		40.0	87	42.5	8.9	28	10.7	0.0	55.0	64	18 52	19 42	20 48				19 45	
	14	30	34.1		39.0	102	10.4	8.9	28	10.7	0.2	55.0	62	18 47	19 34	20 33	17 46		19 07	19 02	
	15	45	34.4		38.1	116	38.3	9.0	28	10.5	0.4	55.0	60	18 43	19 27	20 21	16 44	17 49	18 20	18 33	
	16	60	34.6		37.1	131	06.3	9.0	28	10.1	0.4	55.0	N 58	18 40	19 21	20 11	16 10	17 12	17 50	18 11	
	17	75	34.8		36.2	145	34.3	9.0	28	09.7	0.7	54.9	56	18 37	19 15	20 02	15 45	16 46	17 27	17 53	
	18	90	35.0	N 5	35.3	160	02.3	9.0	N28	09.0	0.7	54.9	54	18 34	19 11	19 55	15 26	16 25	17 08	17 37	
	19	105	35.2		34.3	174	30.3	9.1	28	08.3	0.9	54.9	52	18 32	19 06	19 48	15 09	16 08	16 52	17 24	
	20	120	35.4		33.4	188	58.4	9.1	28	07.4	1.1	54.9	50	18 30	19 03	19 42	14 55	15 53	16 38	17 12	
	21	135	35.7		32.4	203	26.5	9.1	28	06.3	1.1	54.9	45	18 25	18 55	19 30	14 25	15 23	16 10	16 48	
	22	150	35.9		31.5	217	54.6	9.2	28	05.2	1.4	54.8	N 40	18 21	18 48	19 21	14 03	15 00	15 48	16 28	
	23	165	36.1		30.6	232	22.8	9.3	28	03.8	1.4	54.8	35	18 17	18 43	19 13	13 44	14 40	15 29	16 11	
S A T U R D A Y	9 00	180	36.3	N 5	29.6	246	51.1	9.2	N28	02.4	1.7	54.8	30	18 14	18 39	19 07	13 28	14 24	15 14	15 57	
	01	195	36.5		28.7	261	19.3	9.3	28	00.7	1.7	54.8	20	18 09	18 32	18 57	13 01	13 56	14 47	15 33	
	02	210	36.7		27.7	275	47.6	9.4	27	59.0	1.9	54.8	N 10	18 05	18 26	18 51	12 37	13 32	14 23	15 12	
	03	225	37.0		26.8	290	16.0	9.4	27	57.1	2.0	54.7	0	18 01	18 22	18 46	12 15	13 09	14 02	14 52	
	04	240	37.2		25.8	304	44.4	9.4	27	55.1	2.2	54.7	S 10	17 57	18 18	18 43	11 54	12 47	13 40	14 32	
	05	255	37.4		24.9	319	12.8	9.5	27	52.9	2.3	54.7	20	17 53	18 15	18 41	11 30	12 22	13 16	14 11	
	06	270	37.6	N 5	24.0	333	41.3	9.5	N27	50.6	2.4	54.7	30	17 49	18 13	18 40	11 03	11 54	12 49	13 46	
	07	285	37.8		23.0	348	09.8	9.5	27	48.2	2.6	54.7	35	17 46	18 11	18 41	10 47	11 38	12 33	13 31	
	08	300	38.0		22.1	2	38.3	9.7	27	45.6	2.7	54.6	40	17 43	18 10	18 42	10 29	11 18	12 14	13 14	
	09	315	38.2		21.1	17	07.0	9.6	27	42.9	2.9	54.6	45	17 40	18 09	18 43	10 06	10 54	11 51	12 53	
	10	330	38.5		20.2	31	35.6	9.7	27	40.0	3.0	54.6	S 50	17 36	18 08	18 46	09 38	10 24	11 21	12 27	
	11	345	38.7		19.2	46	04.3	9.8	27	37.0	3.1	54.6	52	17 34	18 08	18 47	09 24	10 09	11 07	12 15	
	12	0	38.9	N 5	18.3	60	33.1	9.8	N27	33.9	3.2	54.6	54	17 32	18 08	18 49	09 08	09 51	10 50	12 00	
	13	15	39.1		17.4	75	01.9	9.9	27	30.7	3.4	54.6	56	17 30	18 07	18 51	08 49	09 30	10 30	11 43	
	14	30	39.3		16.4	89	30.8	9.9	27	27.3	3.5	54.5	58	17 28	18 07	18 53	0				

2023 SEPTEMBER 10, 11, 12 (SUN., MON., TUES.)																									
UT		ARIES			VENUS -4.8			MARS +1.7			JUPITER -2.7			SATURN +0.4			STARS								
		GHA		Dec		GHA		Dec		GHA		Dec		GHA		Dec		Name		SHA		Dec			
d h		° ' "		° ' "		° ' "		° ' "		° ' "		° ' "		° ' "		° ' "									
10	00	348	46.4	215	12.4	N11	01.1	160	35.0	S 2	55.8	305	18.0	N15	12.2	13	20.5	S12	08.4	Acamar	315	12.4	S40	12.3	
	01	3	48.8	230	14.2		01.4	175	36.0		56.4	320	20.5		12.2	28	23.1		08.4	Achernar	335	20.5	S57	06.8	
	02	18	51.3	245	16.0		01.6	190	36.9		57.1	335	23.0		12.2	43	25.8		08.5	Acruh	173	02.0	S63	13.8	
	03	33	53.8	260	17.8		01.8	205	37.9		57.8	350	25.5		12.2	58	28.4		08.6	Adhara	255	06.9	S28	59.9	
	04	48	56.2	275	19.6		02.0	220	38.9		58.4	5	28.1		12.2	73	31.1		08.6	Aldebaran	290	40.8	N16	33.5	
11	05	63	58.7	290	21.4		02.2	235	39.9		59.1	20	30.6		12.1	88	33.7		08.7						
	06	79	01.1	305	23.2	N11	02.4	250	40.8	S 2	59.7	35	33.1	N15	12.1	103	36.3	S12	08.8	Alioth	166	14.4	N55	50.1	
	07	94	03.6	320	25.0		02.6	265	41.8	3	00.4	50	35.6		12.1	118	39.0		08.8	Alkaid	152	53.2	N49	11.1	
	08	109	06.1	335	26.8		02.8	280	42.8		01.1	65	38.1		12.1	133	41.6		08.9	Alnair	27	33.8	S46	50.8	
	09	124	08.5	350	28.6		03.0	295	43.8		01.7	80	40.6		12.1	148	44.2		09.0	Alnilam	275	38.9	S 1	11.0	
12	10	139	11.0	5	30.4		03.2	310	44.7		02.4	95	43.1		12.0	163	46.9		09.0	Alphard	217	49.1	S 8	45.5	
	11	154	13.5	20	32.2		03.4	325	45.7		03.1	110	45.6		12.0	178	49.5		09.1						
	12	169	15.9	35	34.0	N11	03.6	340	46.7	S 3	03.7	125	48.1	N15	12.0	193	52.1	S12	09.2	Alphecca	126	04.8	N26	38.3	
	13	184	18.4	50	35.8		03.8	355	47.7		04.4	140	50.6		12.0	208	54.8		09.2	Alpheratz	357	35.6	N29	13.3	
	14	199	20.9	65	37.5		04.0	10	48.6		05.0	155	53.2		11.9	223	57.4		09.3	Altair	62	00.8	N 8	56.0	
13	15	214	23.3	80	39.3		04.2	25	49.6		05.7	170	55.7		11.9	239	00.0		09.4	Ankaa	353	07.8	S42	10.5	
	16	229	25.8	95	41.1		04.4	40	50.6		06.4	185	58.2		11.9	254	02.7		09.4	Antares	112	17.3	S26	29.1	
	17	244	28.3	110	42.8		04.6	55	51.6		07.0	201	00.7		11.9	269	05.3		09.5						
	18	259	30.7	125	44.6	N11	04.8	70	52.5	S 3	07.7	216	03.2	N15	11.9	284	07.9	S12	09.5	Arcturus	145	49.1	N19	03.8	
	19	274	33.2	140	46.3		05.0	85	53.5		08.4	231	05.7		11.8	299	10.6		09.6	Atria	107	12.5	S69	04.4	
14	20	289	35.6	155	48.1		05.2	100	54.5		09.0	246	08.2		11.8	314	13.2		09.7	Avior	234	15.7	S59	34.8	
	21	304	38.1	170	49.9		05.4	115	55.5		09.7	261	10.7		11.8	329	15.8		09.7	Bellatrix	278	24.1	N 6	22.4	
	22	319	40.6	185	51.6		05.5	130	56.4		10.3	276	13.3		11.8	344	18.5		09.8	Betelgeuse	270	53.3	N 7	24.8	
	23	334	43.0	200	53.3		05.7	145	57.4		11.0	291	15.8		11.7	359	21.1		09.9						
	11	00	349	45.5	215	55.1	N11	05.9	160	58.4	S 3	11.7	306	18.3	N15	11.7	14	23.8	S12	09.9	Canopus	263	53.0	S52	42.1
12	01	4	48.0	230	56.8		06.1	175	59.4		12.3	321	20.8		11.7	29	26.4		10.0	Capella	280	23.5	N46	01.2	
	02	19	50.4	245	58.6		06.3	191	00.3		13.0	336	23.3		11.7	44	29.0		10.1	Deneb	49	26.2	N45	22.0	
	03	34	52.9	261	00.3		06.5	206	01.3		13.6	351	25.8		11.7	59	31.7		10.1	Denebola	182	26.4	N14	26.6	
	04	49	55.4	276	02.0		06.7	221	02.3		14.3	6	28.4		11.6	74	34.3		10.2	Diphda	348	48.1	S17	51.3	
	05	64	57.8	291	03.7		06.9	236	03.3		15.0	21	30.9		11.6	89	36.9		10.3						
13	06	80	00.3	306	05.5	N11	07.0	251	04.2	S 3	15.6	36	33.4	N15	11.6	104	39.6	S12	10.3	Dubhe	193	43.0	N61	37.5	
	07	95	02.7	321	07.2		07.2	266	05.2		16.3	51	35.9		11.6	119	42.2		10.4	Elnath	278	03.3	N28	37.6	
	08	110	05.2	336	08.9		07.4	281	06.2		16.9	66	38.4		11.5	134	44.8		10.5	Eltanin	90	42.6	N51	29.9	
	09	125	07.7	351	10.6		07.6	296	07.2		17.6	81	40.9		11.5	149	47.5		10.5	Enif	33	39.6	N 9	59.1	
	10	140	10.1	6	12.3		07.8	311	08.1		18.3	96	43.5		11.5	164	50.1		10.6	Fomalhaut	15	15.4	S29	29.7	
14	11	155	12.6	21	14.0		08.0	326	09.1		18.9	111	46.0		11.5	179	52.7		10.7						
	12	170	15.1	36	15.7	N11	08.1	341	10.1	S 3	19.6	126	48.5	N15	11.4	194	55.4	S12	10.7	Gacrux	171	53.5	S57	14.7	
	13	185	17.5	51	17.4		08.3	356	11.0		20.3	141	51.0		11.4	209	58.0		10.8	Gienah	175	45.0	S17	40.3	
	14	200	20.0	66	19.1		08.5	11	12.0		20.9	156	53.5		11.4	225	00.6		10.9	Hadar	148	38.1	S60	29.3	
	15	215	22.5	81	20.8		08.7	26	13.0		21.6	171	56.1		11.4	240	03.3		10.9	Hamal	327	52.2	N23	34.5	
15	16	230	24.9	96	22.5		08.8	41	14.0		22.2	186	58.6		11.3	255	05.9		11.0	Kaus Aust.	83	33.9	S34	22.5	
	17	245	27.4	111	24.1		09.0	56	14.9		22.9	202	01.1		11.3	270	08.5		11.0						
	18	260	29.9	126	25.8	N11	09.2	71	15.9	S 3	23.6	217	03.6	N15	11.3	285	11.2	S12	11.1	Kochab	137	20.4	N74	03.7	
	19	275	32.3	141	27.5		09.4	86	16.9		24.2	232	06.1		11.3	300	13.8		11.2	Makab	13	30.7	N15	20.0	
	20	290	34.8	156	29.2		09.5	101	17.8		24.9	247	08.7		11.3	315	16.4		11.2	Menkar	314	07.1	N 4	11.1	
16	21	305	37.2	171	30.8		09.7	116	18.8		25.5	262	11.2		11.2	330	19.1		11.3	Menkent	147	59.2	S36	29.2	
	22	320	39.7	186	32.5		09.9	131	19.8		26.2	277	13.7		11.2	345	21.7		11.4	Miaplacidus	221	39.3	S69	48.6	
	23	335	42.2	201	34.2		10.0	146	20.8		26.9	292	16.2		11.2	0	24.3		11.4						
	12	00	350	44.6	216	35.8	N11	10.2	161	21.7	S 3	27.5	307	18.8	N15	11.2	15	27.0	S12	11.5	Mirfak	308	29.6	N49	56.1
	01	5	47.1	231	37.5		10.4	176	22.7		28.2	322	21.3		11.1	30	29.6		11.6	Nunki	75	49.0	S26	16.1	
17	02	20	49.6	246	39.1		10.6	191	23.7		28.9	337	23.8		11.1	45	32.2		11.6	Peacock	53	07.0	S56	39.7	
	03	35	52.0	261	40.8		10.7	206	24.6		29.5	352	26.3		11.1	60	34.9		11.7	Pollux	243	18.9	N27	58.2	
	04	50	54.5	276	42.4		10.9	221	25.6		30.2	7	28.9		11.1	75	37.5		11.8	Procyon	244	52.2	N 5	10.0	
	05	65	57.0	291	44.1		11.1	236	26.6		30.8	22	31.4		11.0	90	40.1		11.8						
	06	80	59.4	306	45.7	N11	11.2	251	27.6	S 3	31.5	37	33.9	N15	11.0	105	42.8	S12	11.9	Rasalhague	95	59.5	N12	32.7	
18	07	96	01.9	321	47.3		11.4	266	28.5		32.2	52	36.4		11.0	120	45.4		12.0	Regulus	207	35.9	N11	51.3	
	08	111	04.4	336	49.0		11.5	281	29.5		32.8	67	39.0		10.9	135	48.0		12.0	Rigel	281	04.3	S 8	10.3	
	09	126	06.8	351	50.6		11.7	296	30.5		33.5	82	41.5		10.9	150	50.7		12.1	Rigel Kent.	139	42.3	S60	56.1	
	10	141	09.3	6	52.2		11.9	311	31.4		34.1	97	44.0		10.9	165	53.3		12.1	Sabik	102	04.0	S15	45.2	
	11	156	11.7	21	53.8		12.0	326	32.4		34.8	112	46.5		10.9	180	55.9		12.2						
19	12	171	14.2	36	55.5	N11	12.2	341	33.4	S 3	35.5	127	49.1	N15	10.8	195	58.6	S12	12.3	Schedar	349	31.8	N56	40.0	
	13	186	16.7	51	57.1		12.3	356	34.4		36.1	142	51.6		10.8	211	01.2		12.3	Shaula	96	11.8	S37	07.3	
	14	201	19.1	66	58.7		12.5	11	35.3		36.8	157	54.1		10.8	226	03.8		12.4	Sirius	258	27.3	S16	44.7	
	15	216	21.6	82	00.3		12.6	26	36.3		37.4	172	56.6		10.8	241	06.5		12.5	Spica	158	23.7	S11	17.0	
	16	231																							

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise											
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	10	11	12	13						
	°	'			°	'									h	m	h	m	h	m	h	m	h	m
SUNDAY	d	h	°	'	N	°	'	°	'	°	'	h	m	h	m	h	m	h	m					
	00	180	41.5	0	5	07.0	234	22.5	10.5	N26	46.2	4.8	54.4	N 72	01 24	03 32	04 47				00 20			
	01	195	41.7			06.0	248	52.0	10.5		26	41.4	4.9	54.4	N 70	02 10	03 48	04 55				01 08		
	02	210	41.9			05.1	263	21.5	10.6		26	36.5	5.0	54.4	68	02 39	04 01	05 01		23 12	25 38	01 38		
	03	225	42.2			04.1	277	51.1	10.7		26	31.5	5.2	54.4	66	03 00	04 12	05 06			00 03	02 01		
	04	240	42.4			03.2	292	20.8	10.7		26	26.3	5.3	54.3	64	03 17	04 21	05 11	22 34	24 34	00 34	02 18		
	05	255	42.6			02.2	306	50.5	10.8		26	21.0	5.4	54.3	62	03 30	04 28	05 14	23 16	24 57	00 57	02 32		
	06	270	42.8	N	5	01.3	321	20.3	10.9		N26	15.6	5.6	54.3	60	03 41	04 35	05 18	23 45	25 16	01 16	02 44		
	07	285	43.0		5	00.3	335	50.2	10.9		26	10.0	5.7	54.3	N 58	03 50	04 40	05 21	24 06	00 06	01 31	02 55		
	08	300	43.2		4	59.4	350	20.1	11.0		26	04.3	5.7	54.3	56	03 58	04 45	05 23	24 24	00 24	01 44	03 04		
	09	315	43.5			58.4	4	50.1	11.1		25	58.6	5.9	54.3	54	04 05	04 49	05 25	24 39	00 39	01 56	03 12		
	10	330	43.7			57.5	19	20.2	11.1		25	52.7	6.1	54.3	52	04 12	04 53	05 27	24 52	00 52	02 06	03 19		
	11	345	43.9			56.6	33	50.3	11.2		25	46.6	6.1	54.3	50	04 17	04 56	05 29	25 04	01 04	02 14	03 25		
	12		0 44.1	N	4	55.6	48	20.5	11.2		N25	40.5	6.2	54.2	45	04 28	05 04	05 33	00 23	01 27	02 33	03 39		
	13		15 44.3			54.7	62	50.7	11.3		25	34.3	6.4	54.2	N 40	04 37	05 09	05 37	00 45	01 46	02 48	03 50		
	14		30 44.6			53.7	77	21.0	11.4		25	27.9	6.5	54.2	35	04 44	05 14	05 40	01 03	02 02	03 01	04 00		
	15		45 44.8			52.8	91	51.4	11.5		25	21.4	6.6	54.2	30	04 50	05 18	05 42	01 18	02 15	03 12	04 08		
	16		60 45.0			51.8	106	21.9	11.5		25	14.8	6.7	54.2	20	04 59	05 24	05 46	01 44	02 38	03 31	04 22		
	17		75 45.2			50.9	120	52.4	11.6		25	08.1	6.8	54.2	N 10	05 05	05 29	05 50	02 07	02 58	03 48	04 35		
	18		90 45.4	N	4	49.9	135	23.0	11.7		N25	01.3	7.0	54.2	0	05 09	05 33	05 53	02 28	03 17	04 03	04 46		
	19		105 45.6			49.0	149	53.7	11.7		24	54.3	7.0	54.2	S 10	05 11	05 36	05 57	02 49	03 35	04 18	04 58		
	20		120 45.9			48.0	164	24.4	11.8		24	47.3	7.2	54.2	20	05 12	05 40	06 04	03 37	04 18	04 53	05 24		
	21		135 46.1			47.1	178	55.2	11.8		24	40.1	7.2	54.2	30	05 11	05 40	06 06	03 52	04 31	05 04	05 32		
	22		150 46.3			46.1	193	26.0	12.0		24	32.9	7.4	54.1	35	05 10	05 41	06 08	04 10	04 46	05 16	05 41		
	23		165 46.5			45.2	207	57.0	12.0		24	25.5	7.5	54.1	40	05 07	05 41	06 11	04 31	05 04	05 31	05 52		
MONDAY	00	180	46.7	N	4	44.2	222	28.0	12.0		N24	18.0	7.6	54.1	S 50	05 04	05 42	06 14	04 58	05 27	05 48	06 05		
	01	195	47.0			43.3	236	59.0	12.2		24	10.4	7.6	54.1	52	05 03	05 42	06 15	05 11	05 37	05 56	06 11		
	02	210	47.2			42.3	251	30.2	12.2		24	02.8	7.8	54.1	54	05 01	05 42	06 17	05 26	05 49	06 06	06 17		
	03	225	47.4			41.4	266	01.4	12.3		23	55.0	7.9	54.1	56	04 58	05 41	06 18	05 43	06 03	06 16	06 25		
	04	240	47.6			40.4	280	32.7	12.3		23	47.1	8.0	54.1	58	04 56	05 41	06 20	06 05	06 19	06 28	06 33		
	05	255	47.8			39.5	295	04.0	12.4		23	39.1	8.1	54.1	S 60	04 53	05 41	06 22	06 31	06 39	06 41	06 42		
	06	270	48.1	N	4	38.5	309	35.4	12.5		N23	31.0	8.2	54.1	Lat.		Sunset		Twilight		Moonset			
	07	285	48.3			37.6	324	06.9	12.6		23	22.8	8.3	54.1					Civil		Naut.		10	11
	08	300	48.5			36.6	338	38.5	12.6		23	14.5	8.5	54.1									12	13
	09	315	48.7			35.7	353	10.1	12.7		23	06.0	8.5	54.1										
	10	330	48.9			34.7	7	41.8	12.7		22	57.5	8.6	54.1										
	11	345	49.2			33.8	22	13.5	12.9		22	48.9	8.7	54.1										
	12		0 49.4	N	4	32.8	36	45.4	12.9		N22	40.2	8.7	54.0	N 72	19 03	20 18	22 19			21 12	20 01		
	13		15 49.6			31.9	51	17.3	12.9		22	31.5	8.9	54.0	N 70	18 56	20 02	21 37			20 22	19 40		
	14		30 49.8			30.9	65	49.2	13.1		22	22.6	9.0	54.0	68	18 50	19 49	21 10		20 46	19 51	19 23		
	15		45 50.0			30.0	80	21.3	13.1		22	13.6	9.1	54.0	66	18 45	19 39	20 50		19 54	19 27	19 10		
	16		60 50.3			29.0	94	53.4	13.2		22	04.5	9.2	54.0	64	18 41	19 30	20 34	19 45	19 22	19 08	18 58		
	17		75 50.5			28.1	109	25.6	13.2		21	55.3	9.2	54.0	62	18 37	19 23	20 21	19 02	18 57	18 53	18 49		
	18		90 50.7	N	4	27.1	123	57.8	13.3		N21	46.1	9.4	54.0	60	18 34	19 17	20 10	18 33	18 38	18 40	18 40		
	19		105 50.9			26.2	138	30.1	13.4		21	36.7	9.4	54.0	N 58	18 32	19 12	20 01	18 11	18 22	18 29	18 33		
	20		120 51.1			25.2	153	02.5	13.4		21	27.3	9.5	54.0	56	18 29	19 07	19 53	17 53	18 09	18 19	18 27		
	21		135 51.3			24.3	167	34.9	13.5		21	17.8	9.7	54.0	54	18 27	19 03	19 46	17 37	17 57	18 11	18 21		
	22		150 51.6			23.3	182	07.4	13.6		21	08.1	9.7	54.0	52	18 25	18 59	19 40	17 24	17 46	18 03	18 16		
	23		165 51.8			22.4	196	40.0	13.6		20	58.4	9.8	54.0	50	18 23	18 56	19 35	17 12	17 37	17 56	18 11		
	TUESDAY	00	180	52.0	N	4	21.4	211	12.6	13.8		N20	48.6	9.8	54.0	45	18 19	18 49	19 24	16 48	17 17	17 41	18 00	
01		195	52.2			20.5	225	45.4	13.7		20	38.8	10.0	54.0	N 40	18 16	18 43	19 15	16 28	17 01	17 28	17 52		
02		210	52.4			19.5	240	18.1	13.9		20	28.8	10.1	54.0	35	18 13	18 39	19 09	16 11	16 47	17 17	17 44		
03		225	52.7			18.6	254	51.0	13.9		20	18.7	10.1	54.0	30	18 11	18 35	19 03	15 57	16 35	17 08	17 38		
04		240	52.9			17.6	269	23.9	13.9		20	08.6	10.2	54.0	20	18 07	18 29	18 55	15 33	16 14	16 52	17 26		
05		255	53.1			16.7	283	56.8	14.1		19	58.4	10.3	54.0	N 10	18 03	18 24	18 49	15 12	15 56	16 38	17 16		
06		270	53.3	N	4	15.7	298	29.9	14.1		N19	48.1	10.4	54.0	0	18 00	18 21	18 45	14 52	15 39	16 24	17 06		
07		285	53.5			14.7	313	03.0	14.1		19	37.7	10.4	54.0	S 10	17 57	18 18	18 42	14 32	15 22	16 11	16 57		
08		300	53.8			13.8	327	36.1	14.2		19	27.3	10.5	54.0	20	17 54	18 16	18 41	14 11	15 04	15 56	16 46		
09		315	54.0			12.8	342	09.3	14.3		19	16.8	10.7	54.0	30	17 50	18 14	18 42	13 46	14 43	15 39	16 34		
10		330	54.2			11.9	356	42.6	14.4		19	06.1	10.6	54.0	35	17 48	18 13	18 43	13 31	14 30	15 29	16 27		
11		345	54.4			10.9	11	16.0	14.4		18	55.5	10.8	54.0	40	17 46	18 13	18 44	13 14	14 16	15 18	16 20		
12			0 54.7	N	4	10.0	25	49.4	14.4															

UT	ARIES	VENUS -4.8	MARS +1.7	JUPITER -2.7	SATURN +0.5	STARS		
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA Dec
WEDNESDAY	00 351 43.8	217 14.6 N11 14.0	161 45.0 S 3 43.4	308 19.4 N15 10.5	16 30.1 S12 13.0	Acamar	315 12.4 S40 12.3	
	01 6 46.2	232 16.2 14.2	176 46.0 44.1	323 22.0 10.5	31 32.8 13.1	Achernar	335 20.5 S57 06.8	
	02 21 48.7	247 17.8 14.3	191 47.0 44.7	338 24.5 10.5	46 35.4 13.2	Acrux	173 02.0 S63 13.8	
	03 36 51.2	262 19.4 14.5	206 47.9 45.4	353 27.0 10.4	61 38.0 13.2	Adhara	255 06.9 S28 59.9	
	04 51 53.6	277 20.9 14.6	221 48.9 46.0	8 29.6 10.4	76 40.7 13.3	Aldebaran	290 40.8 N16 33.5	
	05 66 56.1	292 22.5 14.7	236 49.9 46.7	23 32.1 10.4	91 43.3 13.4			
	06 81 58.6	307 24.0 N11 14.9	251 50.8 S 3 47.4	38 34.6 N15 10.4	106 45.9 S12 13.4	Alioth	166 14.4 N55 50.1	
	07 97 01.0	322 25.6 15.0	266 51.8 48.0	53 37.2 10.3	121 48.6 13.5	Alkaid	152 53.2 N49 11.9	
	08 112 03.5	337 27.2 15.2	281 52.8 48.7	68 39.7 10.3	136 51.2 13.6	Alnair	27 33.8 S46 50.8	
	09 127 06.0	352 28.7 15.3	296 53.7 49.3	83 42.2 10.3	151 53.8 13.6	Alnilam	275 38.9 S 1 11.0	
	10 142 08.4	7 30.3 15.4	311 54.7 50.0	98 44.8 10.2	166 56.5 13.7	Alphard	217 49.1 S 8 45.5	
	11 157 10.9	22 31.8 15.6	326 55.7 50.7	113 47.3 10.2	181 59.1 13.7			
	12 172 13.3	37 33.3 N11 15.7	341 56.6 S 3 51.3	128 49.8 N15 10.2	197 01.7 S12 13.8	Alphecca	126 04.8 N26 38.3	
	13 187 15.8	52 34.9 15.9	356 57.6 52.0	143 52.4 10.2	212 04.4 13.9	Alpheratz	357 35.6 N29 13.3	
	14 202 18.3	67 36.4 16.0	11 58.6 52.6	158 54.9 10.1	227 07.0 13.9	Altair	62 00.8 N 8 56.0	
	15 217 20.7	82 37.9 16.1	26 59.5 53.3	173 57.4 10.1	242 09.6 14.0	Ankaa	353 07.8 S42 10.5	
	16 232 23.2	97 39.5 16.3	42 00.5 54.0	189 00.0 10.1	257 12.2 14.1	Antares	112 17.3 S26 29.1	
	17 247 25.7	112 41.0 16.4	57 01.5 54.6	204 02.5 10.0	272 14.9 14.1			
	18 262 28.1	127 42.5 N11 16.5	72 02.4 S 3 55.3	219 05.1 N15 10.0	287 17.5 S12 14.2	Arcturus	145 49.2 N19 03.7	
	19 277 30.6	142 44.0 16.7	87 03.4 55.9	234 07.6 10.0	302 20.1 14.2	Atria	107 12.5 S69 04.4	
	20 292 33.1	157 45.6 16.8	102 04.4 56.6	249 10.1 10.0	317 22.8 14.3	Avior	234 15.6 S59 34.8	
	21 307 35.5	172 47.1 16.9	117 05.3 57.3	264 12.7 09.9	332 25.4 14.4	Bellatrix	278 24.1 N 6 22.4	
	22 322 38.0	187 48.6 17.0	132 06.3 57.9	279 15.2 09.9	347 28.0 14.4	Betelgeuse	270 53.3 N 7 24.8	
	23 337 40.4	202 50.1 17.2	147 07.3 58.6	294 17.7 09.9	2 30.7 14.5			
THURSDAY	00 352 42.9	217 51.6 N11 17.3	162 08.2 S 3 59.3	309 20.3 N15 09.8	17 33.3 S12 14.6	Canopus	263 53.0 S52 42.1	
	01 7 45.4	232 53.1 17.4	177 09.2 59.9	324 22.8 09.8	32 35.9 14.6	Capella	280 23.5 N46 01.2	
	02 22 47.8	247 54.6 17.6	192 10.2 4 00.6	339 25.4 09.8	47 38.6 14.7	Deneb	49 26.2 N45 22.1	
	03 37 50.3	262 56.1 17.7	207 11.1 01.2	354 27.9 09.7	62 41.2 14.8	Denebola	182 26.4 N14 26.6	
	04 52 52.8	277 57.6 17.8	222 12.1 01.9	9 30.5 09.7	77 43.8 14.8	Diphda	348 48.1 S17 51.3	
	05 67 55.2	292 59.1 17.9	237 13.1 02.6	24 33.0 09.7	92 46.4 14.9			
	06 82 57.7	308 00.5 N11 18.0	252 14.0 S 4 03.2	39 35.5 N15 09.7	107 49.1 S12 14.9	Dubhe	193 43.0 N61 37.5	
	07 98 00.2	323 02.0 18.2	267 15.0 03.9	54 38.1 09.6	122 51.7 15.0	Elnath	278 03.3 N28 37.6	
	08 113 02.6	338 03.5 18.3	282 16.0 04.5	69 40.6 09.6	137 54.3 15.1	Eltanin	90 42.6 N51 29.4	
	09 128 05.1	353 05.0 18.4	297 16.9 05.2	84 43.2 09.6	152 57.0 15.1	Enif	33 39.6 N 9 59.1	
	10 143 07.6	8 06.4 18.5	312 17.9 05.9	99 45.7 09.5	167 59.6 15.2	Fomalhaut	15 15.4 S29 29.8	
	11 158 10.0	23 07.9 18.6	327 18.8 06.5	114 48.3 09.5	183 02.2 15.3			
	12 173 12.5	38 09.4 N11 18.8	342 19.8 S 4 07.2	129 50.8 N15 09.5	198 04.8 S12 15.3	Gacrux	171 53.5 S57 14.7	
	13 188 14.9	53 10.8 18.9	357 20.8 07.8	144 53.3 09.4	213 07.5 15.4	Gienah	175 45.1 S17 40.3	
	14 203 17.4	68 12.3 19.0	12 21.7 08.5	159 55.9 09.4	228 10.1 15.4	Hadar	148 38.1 S60 29.3	
	15 218 19.9	83 13.8 19.1	27 22.7 09.2	174 58.4 09.4	243 12.7 15.5	Hamal	327 52.2 N23 34.5	
	16 233 22.3	98 15.2 19.2	42 23.7 09.8	190 01.0 09.3	258 15.4 15.6	Kaus Aust.	83 33.9 S34 22.5	
	17 248 24.8	113 16.7 19.3	57 24.6 10.5	205 03.5 09.3	273 18.0 15.6			
	18 263 27.3	128 18.1 N11 19.4	72 25.6 S 4 11.1	220 06.1 N15 09.3	288 20.6 S12 15.7	Kochab	137 20.4 N74 03.7	
	19 278 29.7	143 19.6 19.5	87 26.6 11.8	235 08.6 09.3	303 23.3 15.8	Markab	13 30.7 N15 20.0	
	20 293 32.2	158 21.0 19.6	102 27.5 12.5	250 11.2 09.2	318 25.9 15.8	Menkar	314 07.1 N 4 11.1	
	21 308 34.7	173 22.4 19.8	117 28.5 13.1	265 13.7 09.2	333 28.5 15.9	Menkent	147 59.2 S36 29.2	
	22 323 37.1	188 23.9 19.9	132 29.5 13.8	280 16.3 09.2	348 31.1 15.9	Miaplacidus	221 39.3 S69 48.6	
	23 338 39.6	203 25.3 20.0	147 30.4 14.4	295 18.8 09.1	3 33.8 16.0			
FRIDAY	00 353 42.1	218 26.7 N11 20.1	162 31.4 S 4 15.1	310 21.4 N15 09.1	18 36.4 S12 16.1	Mirfak	308 29.6 N49 56.6	
	01 8 44.5	233 28.2 20.2	177 32.3 15.8	325 23.9 09.1	33 39.0 16.1	Nunki	75 49.0 S26 16.1	
	02 23 47.0	248 29.6 20.3	192 33.3 16.4	340 26.5 09.0	48 41.7 16.2	Peacock	53 07.0 S56 39.7	
	03 38 49.4	263 31.0 20.4	207 34.3 17.1	355 29.0 09.0	63 44.3 16.3	Pollux	243 18.9 N27 58.2	
	04 53 51.9	278 32.4 20.5	222 35.2 17.7	10 31.5 09.0	78 46.9 16.3	Procyon	244 52.2 N 5 10.0	
	05 68 54.4	293 33.8 20.6	237 36.2 18.4	25 34.1 08.9	93 49.5 16.4			
	06 83 56.8	308 35.3 N11 20.7	252 37.2 S 4 19.1	40 36.7 N15 08.9	108 52.2 S12 16.4	Rasalhague	95 59.6 N12 32.7	
	07 98 59.3	323 36.7 20.8	267 38.1 19.7	55 39.2 08.9	123 54.8 16.5	Regulus	207 35.9 N11 51.2	
	08 114 01.8	338 38.1 20.9	282 39.1 20.4	70 41.8 08.8	138 57.4 16.6	Rigel	281 04.9 S 8 10.2	
	09 129 04.2	353 39.5 21.0	297 40.0 21.0	85 44.3 08.8	154 00.1 16.6	Rigil Kent.	139 42.3 S60 56.1	
	10 144 06.7	8 40.9 21.1	312 41.0 21.7	100 46.9 08.8	169 02.7 16.7	Sabik	102 04.1 S15 45.2	
	11 159 09.2	23 42.3 21.2	327 42.0 22.4	115 49.4 08.7	184 05.3 16.8			
	12 174 11.6	38 43.7 N11 21.3	342 42.9 S 4 23.0	130 52.0 N15 08.7	199 07.9 S12 16.8	Schedar	349 31.8 N56 40.0	
	13 189 14.1	53 45.1 21.4	357 43.9 23.7	145 54.5 08.7	214 10.6 16.9	Shaula	96 11.8 S37 07.3	
	14 204 16.5	68 46.4 21.5	12 44.8 24.3	160 57.1 08.6	229 13.2 16.9	Sirius	258 27.3 S16 44.7	
	15 219 19.0	83 47.8 21.5	27 45.8 25.0	175 59.6 08.6	244 15.8 17.0	Spica	158 23.7 S11 17.0	
	16 234 21.5	98 49.2 21.6	42 46.8 25.7	191 02.2 08.6	259 18.4 17.1	Suhail	222 47.5 S43 31.4	
	17 249 23.9	113 50.6 21.7	57 47.7 26.3	206 04.7 08.5	274 21.1 17.1			
	18 264 26.4	128 52.0 N11 21.8	72 48.7 S 4 27.0	221 07.3 N15 08.5	289 23.7 S12 17.2	Vega	80 33.8 N38 48.6	
	19 279 28.9	143 53.3 21.9	87 49.7 27.6	236 09.8 08.5	304 26.3 17.2	Zuben'ubi	136 57.4 S16 08.3	
	20 294 31.3	158 54.7 22.0	102 50.6 28.3	251 12.4 08.4	319 29.0 17.3			
	21 309 33.8	173 56.1 22.1	117 51.6 28.9	266 14.9 08.4	334 31.6 17.4			
	22 324 36.3	188 57.4 22.2	132 52.5 29.6	281 17.5 08.4	349 34.2 17.4	Venus	225 08.7 9 28	
	23 339 38.7	203 58.8 22.2	147 53.5 30.3	296 20.1 08.3	4 36.8 17.5	Mars	169 25.3 13 11	
						Jupiter	316 37.4 3 22	
						Saturn	24 50.4 22 46	
Mer.Pass.	0 29.1	v 1.5 d 0.1	v 1.0 d 0.7	v 2.5 d 0.0	v 2.6 d 0.1			

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise												
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	13	14	15	16								
	°	'		°	'																				
13 WEDNESDAY	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m					
	180	57.3	N	3	58.5	200	34.8	15.1	N16	29.9	11.7	54.0	N 72	01 56	03 48	05 01	00 20	02 59	05 04	07 02					
	01	195	57.5		57.6	215	08.9	15.2		16	18.2	11.7	54.0	N 70	02 31	04 02	05 07	01 08	03 18	05 11	07 01				
	02	210	57.7		56.6	229	43.1	15.3		16	06.5	11.8	54.0	68	02 55	04 13	05 12	01 38	03 33	05 17	06 59				
	03	225	58.0		55.7	244	17.4	15.3		15	54.7	11.9	54.0	66	03 13	04 23	05 16	02 01	03 44	05 22	06 58				
	04	240	58.2		54.7	258	51.7	15.4		15	42.8	11.9	54.0	64	03 28	04 30	05 19	02 18	03 54	05 26	06 57				
	05	255	58.4		53.7	273	26.1	15.4		15	30.9	12.0	54.0	62	03 40	04 37	05 22	02 32	04 03	05 30	06 56				
	06	270	58.6	N	3	52.8	288	00.5	15.4	N15	18.9	12.1	54.0	60	03 50	04 42	05 25	02 44	04 10	05 33	06 55				
	07	285	58.8		51.8	302	34.9	15.5		15	06.8	12.1	54.0	N 58	03 58	04 47	05 27	02 55	04 16	05 36	06 55				
	08	300	59.1		50.9	317	09.4	15.6		14	54.7	12.1	54.0	56	04 05	04 51	05 29	03 04	04 22	05 38	06 54				
	09	315	59.3		49.9	331	44.0	15.6		14	42.6	12.3	54.0	54	04 12	04 55	05 31	03 12	04 26	05 40	06 54				
	10	330	59.5		49.0	346	18.6	15.6		14	30.3	12.3	54.0	52	04 17	04 58	05 32	03 19	04 31	05 42	06 53				
	11	345	59.7		48.0	0	53.2	15.7		14	18.0	12.3	54.0	50	04 22	05 01	05 34	03 25	04 35	05 44	06 53				
	12	1	00.0	N	3	47.0	15	27.9	15.8	N14	05.7	12.4	54.0	45	04 32	05 07	05 37	03 39	04 44	05 48	06 52				
	13	16	00.2		46.1	30	02.7	15.8		13	53.3	12.4	54.0	N 40	04 40	05 12	05 40	03 50	04 51	05 51	06 51				
	14	31	00.4		45.1	44	37.5	15.8		13	40.9	12.5	54.0	35	04 47	05 16	05 42	04 00	04 57	05 54	06 50				
	15	46	00.6		44.2	59	12.3	15.8		13	28.4	12.6	54.0	30	04 52	05 20	05 44	04 08	05 02	05 56	06 50				
	16	61	00.8		43.2	73	47.1	16.0		13	15.8	12.6	54.0	20	04 59	05 25	05 47	04 22	05 12	06 00	06 49				
	17	76	01.1		42.3	88	22.1	15.9		13	03.2	12.7	54.0	N 10	05 04	05 29	05 50	04 35	05 20	06 04	06 48				
	18	91	01.3	N	3	41.3	102	57.0	16.0	N12	50.5	12.7	54.0	0	05 08	05 32	05 52	04 46	05 28	06 08	06 47				
	19	106	01.5		40.3	117	32.0	16.0		12	37.8	12.7	54.0	S 10	05 09	05 34	05 55	04 58	05 35	06 11	06 46				
	20	121	01.7		39.4	132	07.0	16.1		12	25.1	12.9	54.0	20	05 10	05 35	05 57	05 10	05 43	06 15	06 46				
	21	136	01.9		38.4	146	42.1	16.1		12	12.2	12.8	54.0	30	05 08	05 36	06 00	05 24	05 52	06 19	06 45				
	22	151	02.2		37.5	161	17.2	16.2		11	59.4	12.9	54.0	35	05 07	05 36	06 01	05 32	05 58	06 21	06 44				
	23	166	02.4		36.5	175	52.4	16.2		11	46.5	13.0	54.1	40	05 05	05 36	06 03	05 41	06 03	06 24	06 44				
14 THURSDAY	00	181	02.6	N	3	35.6	190	27.6	16.2	N11	33.5	13.0	54.1	S 50	04 58	05 35	06 07	06 05	06 19	06 31	06 42				
	01	196	02.8		34.6	205	02.8	16.2		11	20.5	13.0	54.1	52	04 56	05 35	06 08	06 11	06 22	06 32	06 42				
	02	211	03.1		33.6	219	38.0	16.3		11	07.5	13.1	54.1	54	04 53	05 34	06 09	06 17	06 26	06 34	06 41				
	03	226	03.3		32.7	234	13.3	16.3		10	54.4	13.1	54.1	56	04 50	05 34	06 11	06 25	06 31	06 36	06 41				
	04	241	03.5		31.7	248	48.6	16.4		10	41.3	13.2	54.1	58	04 47	05 33	06 12	06 33	06 36	06 38	06 41				
	05	256	03.7		30.8	263	24.0	16.4		10	28.1	13.2	54.1	S 60	04 43	05 32	06 13	06 42	06 42	06 41	06 40				
	06	271	03.9	N	3	29.8	277	59.4	16.4	N10	14.9	13.3	54.1	Lat.		Sunset		Twilight		Moonset					
	07	286	04.2		28.8	292	34.8	16.5		10	01.6	13.3	54.1					Civil		Naut.		13	14	15	16
	08	301	04.4		27.9	307	10.3	16.4		9	48.3	13.3	54.1												
	09	316	04.6		26.9	321	45.7	16.5		9	35.0	13.4	54.1												
	10	331	04.8		26.0	336	21.2	16.6		9	21.6	13.4	54.1												
	11	346	05.0		25.0	350	56.8	16.5		9	08.2	13.4	54.1												
	12	1	05.3	N	3	24.1	5	32.3	16.6	N 8	54.8	13.5	54.1	N 72	18 47	19 59	21 48	20 01	19 21	18 48	18 17				
	13	16	05.5		23.1	20	07.9	16.6		8	41.3	13.5	54.1	N 70	18 42	19 46	21 15	19 40	19 11	18 46	18 22				
	14	31	05.7		22.1	34	43.5	16.7		8	27.8	13.6	54.2	68	18 37	19 35	20 52	19 23	19 02	18 44	18 26				
	15	46	05.9		21.2	49	19.2	16.6		8	14.2	13.6	54.2	66	18 34	19 26	20 35	19 10	18 55	18 43	18 30				
	16	61	06.2		20.2	63	54.8	16.7		8	00.6	13.6	54.2	64	18 30	19 19	20 21	18 58	18 50	18 41	18 33				
	17	76	06.4		19.3	78	30.5	16.7		7	47.0	13.7	54.2	62	18 28	19 13	20 09	18 49	18 44	18 40	18 36				
	18	91	06.6	N	3	18.3	93	06.2	16.7	N 7	33.3	13.6	54.2	60	18 25	19 08	20 00	18 40	18 40	18 39	18 38				
	19	106	06.8		17.3	107	41.9	16.7		7	19.7	13.8	54.2	N 58	18 23	19 03	19 51	18 33	18 36	18 38	18 40				
	20	121	07.0		16.4	122	17.6	16.8		7	05.9	13.7	54.2	56	18 21	18 59	19 44	18 27	18 32	18 37	18 42				
	21	136	07.3		15.4	136	53.4	16.8		6	52.2	13.8	54.2	54	18 19	18 55	19 38	18 21	18 29	18 37	18 44				
	22	151	07.5		14.5	151	29.2	16.7		6	38.4	13.8	54.2	52	18 18	18 52	19 33	18 16	18 26	18 36	18 45				
	23	166	07.7		13.5	166	04.9	16.9		6	24.6	13.8	54.2	50	18 17	18 49	19 28	18 11	18 24	18 35	18 47				
	15 FRIDAY	00	181	07.9	N	3	12.5	180	40.8	16.8	N 6	10.8	13.9	54.2	45	18 14	18 43	19 18	18 00	18 18	18 34	18 50			
01		196	08.2		11.6	195	16.6	16.8		5	56.9	13.9	54.2	N 40	18 11	18 38	19 10	17 52	18 13	18 33	18 53				
02		211	08.4		10.6	209	52.4	16.8		5	43.0	13.9	54.3	35	18 09	18 34	19 04	17 44	18 09	18 32	18 55				
03		226	08.6		9.6	224	28.2	16.9		5	29.1	13.9	54.3	30	18 07	18 31	18 59	17 38	18 05	18 31	18 57				
04		241	08.8		8.7	239	04.1	16.9		5	15.2	14.0	54.3	20	18 04	18 26	18 52	17 26	17 58	18 29	19 00				
05		256	09.0		7.7	253	40.0	16.8		5	01.2	13.9	54.3	N 10	18 01	18 22	18 47	17 16	17 52	18 28	19 03				
06		271	09.3	N	3	06.8	268	15.8	16.9	N 4	47.3	14.0	54.3	0	17 59	18 20	18 44	17 06	17 47	18 27	19 06				
07		286	09.5		05.8	282	51.7	16.9		4	33.3	14.1	54.3	S 10	17 57	18 18	18 42	16 57	17 41	18 25	19 09				
08		301	09.7		04.8	297	27.6	16.9		4	19.2	14.0	54.3	20	17 54	18 16	18 42	16 46	17 35	18 24	19 12				
09		316	09.9		03.9	312	03.5	16.9		4	05.2	14.1	54.3	30	17 52	18 16	18 43	16 34	17 28	18 22	19 16				
10		331	10.2		02.9	326	39.4	16.9		4	05.2	14.1	54.3	35	17 50	18 16	18 45	16 27	17 24	18 21	19 18				
11		346	10.4		02.0	341	15.3	17.0		3	51.1	14.1	54.3	40	17 49	18 16	18 47	16 20	17 20	18 20	19 20				
12		1	10.6	N	3	01.0	355	51.3	16.9	N 3	22.9	14.1	54.3	45	17 47	18 16	18 50	16 10	17 15	18 19	19 23				
13		16	10.8		3	00.0</																			

UT	ARIES		VENUS -4.8		MARS +1.7		JUPITER -2.7		SATURN +0.5		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
SATURDAY	00	354 41.2	219 00.2 N11 22.3	162 54.5 S 4 30.9	311 22.6 N15 08.3	19 39.5 S12 17.6	Acamar	315 12.3 S40 12.3					
	01	9 43.7	234 01.5 22.4	177 55.4 31.6	326 25.2 08.3	34 42.1 17.6	Achernar	335 20.5 S57 06.8					
	02	24 46.1	249 02.9 22.5	192 56.4 32.2	341 27.7 08.2	49 44.7 17.7	Acrux	173 02.0 S63 13.8					
	03	39 48.6	264 04.2 . . 22.6	207 57.3 . . 32.9	356 30.3 . . 08.2	64 47.3 . . 17.7	Adhara	255 06.9 S28 59.9					
	04	54 51.0	279 05.6 22.7	222 58.3 33.6	11 32.8 08.2	79 50.0 17.8	Aldebaran	290 40.8 N16 33.5					
	05	69 53.5	294 06.9 22.7	237 59.3 34.2	26 35.4 08.1	94 52.6 17.9							
	06	84 56.0	309 08.3 N11 22.8	253 00.2 S 4 34.9	41 38.0 N15 08.1	109 55.2 S12 17.9	Alioth	166 14.4 N55 50.1					
	07	99 58.4	324 09.6 22.9	268 01.2 35.5	56 40.5 08.1	124 57.9 18.0	Alkaid	152 53.3 N49 11.9					
	08	115 00.9	339 10.9 23.0	283 02.1 36.2	71 43.1 08.0	140 00.5 18.0	Alnair	27 33.8 S46 50.8					
	09	130 03.4	354 12.3 . . 23.0	298 03.1 . . 36.9	86 45.6 . . 08.0	155 03.1 . . 18.1	Alnilam	275 38.8 S 1 11.0					
	10	145 05.8	9 13.6 23.1	313 04.1 37.5	101 48.2 07.9	170 05.7 18.2	Alphard	217 49.1 S 8 45.5					
	11	160 08.3	24 14.9 23.2	328 05.0 38.2	116 50.8 07.9	185 08.4 18.2							
	12	175 10.8	39 16.2 N11 23.3	343 06.0 S 4 38.8	131 53.3 N15 07.9	200 11.0 S12 18.3	Alphecca	126 04.8 N26 38.3					
	13	190 13.2	54 17.6 23.3	358 06.9 39.5	146 55.9 07.8	215 13.6 18.4	Alpheratz	357 35.6 N29 13.3					
	14	205 15.7	69 18.9 23.4	13 07.9 40.2	161 58.4 07.8	230 16.2 18.4	Altair	62 00.9 N 8 56.0					
	15	220 18.1	84 20.2 . . 23.5	28 08.8 . . 40.8	177 01.0 . . 07.8	245 18.9 . . 18.5	Ankaa	353 07.8 S42 10.5					
	16	235 20.6	99 21.5 23.5	43 09.8 41.5	192 03.6 07.7	260 21.5 18.5	Antares	112 17.3 S26 29.1					
	17	250 23.1	114 22.8 23.6	58 10.8 42.1	207 06.1 07.7	275 24.1 18.6							
	18	265 25.5	129 24.1 N11 23.7	73 11.7 S 4 42.8	222 08.7 N15 07.7	290 26.7 S12 18.7	Arcturus	145 49.2 N19 03.7					
	19	280 28.0	144 25.4 23.7	88 12.7 43.4	237 11.3 07.6	305 29.4 18.7	Atria	107 12.6 S69 04.4					
	20	295 30.5	159 26.7 23.8	103 13.6 44.1	252 13.8 07.6	320 32.0 18.8	Avior	234 15.6 S59 34.8					
	21	310 32.9	174 28.0 . . 23.9	118 14.6 . . 44.8	267 16.4 . . 07.5	335 34.6 . . 18.8	Bellatrix	278 24.0 N 6 22.4					
	22	325 35.4	189 29.3 23.9	133 15.5 45.4	282 18.9 07.5	350 37.2 18.9	Betelgeuse	270 53.3 N 7 24.8					
	23	340 37.9	204 30.6 24.0	148 16.5 46.1	297 21.5 07.5	5 39.9 19.0							
SUNDAY	00	355 40.3	219 31.9 N11 24.1	163 17.5 S 4 46.7	312 24.1 N15 07.4	20 42.5 S12 19.0	Canopus	263 53.0 S52 42.1					
	01	10 42.8	234 33.2 24.1	178 18.4 47.4	327 26.6 07.4	35 45.1 19.1	Capella	280 23.5 N46 01.2					
	02	25 45.3	249 34.5 24.2	193 19.4 48.1	342 29.2 07.4	50 47.7 19.1	Deneb	49 26.2 N45 22.1					
	03	40 47.7	264 35.8 . . 24.2	208 20.3 . . 48.7	357 31.8 . . 07.3	65 50.4 . . 19.2	Denebola	182 26.4 N14 26.6					
	04	55 50.2	279 37.1 24.3	223 21.3 49.4	12 34.3 07.3	80 53.0 19.3	Diphda	348 48.1 S17 51.3					
	05	70 52.6	294 38.3 24.3	238 22.2 50.0	27 36.9 07.3	95 55.6 19.3							
	06	85 55.1	309 39.6 N11 24.4	253 23.2 S 4 50.7	42 39.5 N15 07.2	110 58.2 S12 19.4	Dubhe	193 43.0 N61 37.5					
	07	100 57.6	324 40.9 24.5	268 24.2 51.4	57 42.0 07.2	126 00.9 19.4	Elmath	278 03.2 N28 37.6					
	08	116 00.0	339 42.1 24.5	283 25.1 52.0	72 44.6 07.1	141 03.5 19.5	Eltanin	90 42.6 N51 29.4					
	09	131 02.5	354 43.4 . . 24.6	298 26.1 . . 52.7	87 47.2 . . 07.1	156 06.1 . . 19.6	Enif	33 39.6 N 9 59.1					
	10	146 05.0	9 44.7 24.6	313 27.0 53.3	102 49.7 07.1	171 08.7 19.6	Fomalhaut	15 15.4 S29 29.8					
	11	161 07.4	24 45.9 24.7	328 28.0 54.0	117 52.3 07.0	186 11.4 19.7							
	12	176 09.9	39 47.2 N11 24.7	343 28.9 S 4 54.6	132 54.9 N15 07.0	201 14.0 S12 19.7	Gacrux	171 53.5 S57 14.7					
	13	191 12.4	54 48.4 24.8	358 29.9 55.3	147 57.4 07.0	216 16.6 19.8	Gienah	175 45.1 S17 40.3					
	14	206 14.8	69 49.7 24.8	13 30.9 56.0	163 00.0 06.9	231 19.2 19.9	Hadar	148 38.1 S60 29.3					
	15	221 17.3	84 50.9 . . 24.9	28 31.8 . . 56.6	178 02.6 . . 06.9	246 21.9 . . 19.9	Hamal	327 52.2 N23 34.5					
	16	236 19.7	99 52.2 24.9	43 32.8 57.3	193 05.2 06.8	261 24.5 20.0	Kaus Aust.	83 33.9 S34 22.5					
	17	251 22.2	114 53.4 25.0	58 33.7 57.9	208 07.7 06.8	276 27.1 20.0							
	18	266 24.7	129 54.7 N11 25.0	73 34.7 S 4 58.6	223 10.3 N15 06.8	291 29.7 S12 20.1	Kochab	137 20.5 N74 03.7					
	19	281 27.1	144 55.9 25.0	88 35.6 59.3	238 12.9 06.7	306 32.4 20.2	Markab	13 30.7 N15 20.1					
	20	296 29.6	159 57.2 25.1	103 36.6 4 59.9	253 15.4 06.7	321 35.0 20.2	Menkar	314 07.1 N 4 11.1					
	21	311 32.1	174 58.4 . . 25.1	118 37.5 5 00.6	268 18.0 . . 06.6	336 37.6 . . 20.3	Menkent	147 59.2 S36 29.2					
	22	326 34.5	189 59.6 25.2	133 38.5 01.2	283 20.6 06.6	351 40.2 20.3	Miaplacidus	221 39.3 S69 48.5					
	23	341 37.0	205 00.8 25.2	148 39.4 01.9	298 23.2 06.6	6 42.9 20.4							
MONDAY	00	356 39.5	220 02.1 N11 25.2	163 40.4 S 5 02.5	313 25.7 N15 06.5	21 45.5 S12 20.5	Mirfak	308 29.6 N49 56.6					
	01	11 41.9	235 03.3 25.3	178 41.4 03.2	328 28.3 06.5	36 48.1 20.5	Nunki	75 49.0 S26 16.1					
	02	26 44.4	250 04.5 25.3	193 42.3 03.9	343 30.9 06.5	51 50.7 20.6	Peacock	53 07.0 S56 39.7					
	03	41 46.9	265 05.7 . . 25.4	208 43.3 . . 04.5	358 33.4 . . 06.4	66 53.4 . . 20.6	Pollux	243 18.8 N27 58.2					
	04	56 49.3	280 06.9 25.4	223 44.2 05.2	13 36.0 06.4	81 56.0 20.7	Procyon	244 52.1 N 5 10.0					
	05	71 51.8	295 08.2 25.4	238 45.2 05.8	28 38.6 06.3	96 58.6 20.8							
	06	86 54.2	310 09.4 N11 25.5	253 46.1 S 5 06.5	43 41.2 N15 06.3	112 01.2 S12 20.8	Rasalhague	95 59.6 N12 32.7					
	07	101 56.7	325 10.6 25.5	268 47.1 07.1	58 43.7 06.3	127 03.8 20.9	Regulus	207 35.9 N11 51.2					
	08	116 59.2	340 11.8 25.5	283 48.0 07.8	73 46.3 06.2	142 06.5 20.9	Rigel	281 04.9 S 8 10.2					
	09	132 01.6	355 13.0 . . 25.6	298 49.0 . . 08.5	88 48.9 . . 06.2	157 09.1 . . 21.0	Rigel Kent.	139 42.3 S60 56.1					
	10	147 04.1	10 14.2 25.6	313 49.9 09.1	103 51.5 06.1	172 11.7 21.1	Sabik	102 04.1 S15 45.2					
	11	162 06.6	25 15.4 25.6	328 50.9 09.8	118 54.1 06.1	187 14.3 21.1							
	12	177 09.0	40 16.6 N11 25.6	343 51.8 S 5 10.4	133 56.6 N15 06.1	202 17.0 S12 21.2	Schedar	349 31.8 N56 40.0					
	13	192 11.5	55 17.7 25.7	358 52.8 11.1	148 59.2 06.0	217 19.6 21.2	Shaula	96 11.9 S37 07.3					
	14	207 14.0	70 18.9 25.7	13 53.7 11.8	164 01.8 06.0	232 22.2 21.3	Sirius	258 27.3 S16 44.6					
	15	222 16.4	85 20.1 . . 25.7	28 54.7 . . 12.4	179 04.4 . . 05.9	247 24.8 . . 21.4	Spica	158 23.8 S11 17.0					
	16	237 18.9	100 21.3 25.7	43 55.7 13.1	194 06.9 05.9	262 27.4 21.4	Suhail	222 47.5 S43 31.4					
	17	252 21.3	115 22.5 25.8	58 56.6 13.7	209 09.5 05.9	277 30.1 21.5							
	18	267 23.8	130 23.7 N11 25.8	73 57.6 S 5 14.4	224 12.1 N15 05.8	292 32.7 S12 21.5	Vega	80 33.9 N38 48.6					
	19	282 26.3	145 24.8 25.8	88 58.5 15.0	239 14.7 05.8	307 35.3 21.6	Zuben'ubi	136 57.5 S16 08.3					
	20	297 28.7	160 26.0 25.8	103 59.5 15.7	254 17.3 05.7	322 37.9 21.7							
	21	312 31.2	175 27.2 . . 25.8	119 00.4 . . 16.4	269 19.8 . . 05.7	337 40.6 . . 21.7							
	22	327 33.7	190 28.3 25.9	134 01.4 17.0	284 22.4 05.6	352 43.2 21.8	Venus	223 51.6 h 9 21					
	23	342 36.1	205 29.5 25.9	149 02.3 17.7	299 25.0 05.6	7 45.8 21.8	Mars	167 37.1 S 10					
							Jupiter	316 43.1 S 10					
							Saturn	25 02.2 S 23 33					
Mer. Pass.	0 17.3	v 1.3 d 0.0	v 1.0 d 0.7	v 2.6 d 0.0	v 2.6 d 0.1								

UT	SUN			MOON						Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec		GHA	v	Dec	d	HP	Naut.		Civil	16		17	18	19			
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m			
SATURDAY	181	13.3	N 2	171	02.2	16.9	N 0	32.5	14.2	54.5	N 70	02 21	04 04	05 15	07 02	09 04	11 24	13 44	
	196	13.5		185	38.1	16.9		0	18.3	14.3	54.5	68	03 10	04 25	05 22	06 59	08 44	10 36	12 50
	211	13.7		200	14.0	16.8	N 0	04.0	14.3	54.5	66	03 26	04 33	05 25	06 58	08 36	10 20	12 17	
	226	13.9		214	49.8	16.9	S 0	10.3	14.3	54.5	64	03 39	04 39	05 28	06 57	08 30	10 07	11 54	
	241	14.2		229	25.7	16.8		0	24.6	14.3	54.5	62	03 49	04 45	05 30	06 56	08 24	09 56	11 35
	256	14.4		244	01.5	16.8		0	38.9	14.3	54.5	60	03 58	04 50	05 32	06 55	08 19	09 47	11 20
	271	14.6	N 2	258	37.3	16.8	S 0	53.2	14.3	54.6	N 58	04 05	04 54	05 33	06 55	08 15	09 39	11 07	
	286	14.8		273	13.1	16.8		1	07.5	14.3	54.6	56	04 12	04 57	05 35	06 54	08 12	09 32	10 56
	301	15.1		287	48.9	16.8		1	21.8	14.3	54.6	54	04 18	05 00	05 36	06 54	08 08	09 26	10 46
	316	15.3		302	24.7	16.7		1	36.1	14.3	54.6	52	04 23	05 03	05 37	06 53	08 05	09 20	10 38
	331	15.5		317	00.4	16.8		1	50.4	14.3	54.6	50	04 27	05 06	05 38	06 53	08 03	09 15	10 30
	346	15.7		331	36.2	16.7		2	04.7	14.3	54.6	45	04 36	05 11	05 41	06 52	07 57	09 04	10 14
	1	15.9	N 2	346	11.9	16.7	S 2	19.0	14.3	54.6	N 40	04 43	05 15	05 42	06 51	07 52	08 55	10 00	
	16	16.2		0	47.6	16.7		2	33.3	14.3	54.7	35	04 49	05 19	05 44	06 50	07 48	08 47	09 49
	31	16.4		15	23.3	16.6		2	47.6	14.3	54.7	30	04 53	05 21	05 45	06 50	07 44	08 40	09 39
	46	16.6		29	58.9	16.6		3	01.9	14.3	54.7	20	05 00	05 26	05 48	06 49	07 38	08 29	09 22
	61	16.8		44	34.5	16.6		3	16.2	14.3	54.7	N 10	05 04	05 29	05 50	06 48	07 33	08 19	09 08
	76	17.1		59	10.1	16.6		3	30.5	14.3	54.7	0	05 07	05 31	05 51	06 47	07 27	08 10	08 54
	91	17.3	N 2	73	45.7	16.6	S 3	44.8	14.3	54.7	S 10	05 08	05 32	05 53	06 46	07 22	08 00	08 41	
	106	17.5		88	21.3	16.5		3	59.1	14.2	54.7	20	05 07	05 33	05 55	06 46	07 17	07 50	08 27
	121	17.7		102	56.8	16.5		4	13.3	14.3	54.8	30	05 05	05 32	05 56	06 45	07 11	07 39	08 11
	136	17.9		117	32.3	16.4		4	27.6	14.3	54.8	35	05 03	05 32	05 57	06 44	07 08	07 33	08 01
	151	18.2		132	07.7	16.4		4	41.9	14.2	54.8	40	05 00	05 31	05 58	06 44	07 04	07 26	07 51
	166	18.4		146	43.1	16.4		4	56.1	14.2	54.8	45	04 56	05 30	05 59	06 43	06 59	07 17	07 38
	SUNDAY	181	18.6	N 2	161	18.5	16.4	S 5	10.3	14.2	54.8	S 50	04 51	05 29	06 01	06 42	06 54	07 07	07 23
196		18.8		175	53.9	16.3		5	24.5	14.2	54.8	52	04 48	05 28	06 01	06 42	06 52	07 03	07 16
211		19.1		190	29.2	16.3		5	38.7	14.2	54.8	54	04 46	05 27	06 02	06 41	06 49	06 58	07 09
226		19.3		205	04.5	16.3		5	52.9	14.2	54.9	56	04 42	05 26	06 03	06 41	06 46	06 52	07 00
241		19.5		219	39.8	16.2		6	07.1	14.2	54.9	58	04 38	05 24	06 03	06 41	06 43	06 46	06 50
256		19.7		234	15.0	16.2		6	21.3	14.1	54.9	S 60	04 34	05 23	06 04	06 40	06 39	06 39	06 39
271		20.0	N 2	248	50.2	16.1	S 6	35.4	14.2	54.9	Lat.	Sunset	Twilight		Moonset				
286		20.2		263	25.3	16.1		6	49.6	14.1			54.9	Civil	Naut.	16	17	18	19
301		20.4		278	00.4	16.0		7	03.7	14.1	54.9	h m	h m	h m	h m	h m	h m	h m	h m
316		20.6		292	35.4	16.1		7	17.8	14.0	55.0								
331		20.8		307	10.5	15.9		7	31.8	14.1	55.0	N 72	18 32	19 42	21 22	18 17	17 41	16 51	16 00
346		21.1		321	45.4	15.9		7	45.9	14.0	55.0	N 70	18 28	19 31	20 55	18 22	17 55	17 20	16 07
1		21.3	N 2	336	20.3	15.9	S 7	59.9	14.0	55.0	68	18 25	19 22	20 36	18 26	18 07	17 43	17 03	
16		21.5		350	55.2	15.8		8	13.9	14.0	55.0	66	18 22	19 14	20 20	18 30	18 16	18 00	17 37
31		21.7		5	30.0	15.8		8	27.9	13.9	55.0	64	18 20	19 08	20 08	18 33	18 24	18 14	18 02
46		22.0		20	04.8	15.7		8	41.8	14.0	55.1	62	18 18	19 03	19 58	18 36	18 31	18 27	18 22
61		22.2		34	39.5	15.7		8	55.8	13.9	55.1	60	18 16	18 58	19 49	18 38	18 37	18 37	18 38
76		22.4		49	14.2	15.7		9	09.7	13.9	55.1	N 58	18 15	18 54	19 42	18 40	18 43	18 46	18 51
91		22.6	N 2	63	48.9	15.5	S 9	23.6	13.8	55.1	56	18 13	18 51	19 36	18 42	18 47	18 54	19 03	
106		22.8		78	23.4	15.5		9	37.4	13.8	55.1	54	18 12	18 48	19 30	18 44	18 52	19 01	19 14
121		23.1		92	57.9	15.5		9	51.2	13.8	55.1	52	18 11	18 45	19 25	18 45	18 56	19 08	19 23
136		23.3		107	32.4	15.4		10	05.0	13.8	55.2	50	18 10	18 42	19 21	18 47	18 59	19 13	19 31
151		23.5		122	06.8	15.4		10	18.8	13.7	55.2	45	18 08	18 37	19 12	18 50	19 07	19 26	19 49
166		23.7		136	41.2	15.3		10	32.5	13.7	55.2	N 40	18 06	18 33	19 05	18 53	19 13	19 36	20 04
00		181	24.0	N 2	151	15.5	15.2	S10	46.2	13.7	55.2	35	18 05	18 30	19 00	18 55	19 19	19 45	20 16
01	196	24.2		165	49.7	15.2		10	59.9	13.6	55.2	30	18 03	18 27	18 55	18 57	19 24	19 53	20 27
02	211	24.4		180	23.9	15.1		11	13.5	13.6	55.3	20	18 01	18 23	18 49	19 00	19 33	20 07	20 46
03	226	24.6	2	194	58.0	15.0		11	27.1	13.5	55.3	N 10	17 59	18 20	18 45	19 03	19 40	20 19	21 02
04	241	24.9	1	209	32.0	15.0		11	40.6	13.5	55.3	0	17 58	18 19	18 43	19 06	19 47	20 31	21 17
05	256	25.1		224	06.0	15.0		11	54.1	13.5	55.3	S 10	17 56	18 17	18 42	19 09	19 55	20 42	21 33
06	271	25.3	N 1	238	40.0	14.8	S12	07.6	13.4	55.3	20	17 55	18 17	18 42	19 12	20 02	20 54	21 49	
07	286	25.5		253	13.8	14.8		12	21.0	13.4	55.3	30	17 53	18 17	18 45	19 16	20 11	21 08	22 08
08	301	25.7		267	47.6	14.7		12	34.4	13.4	55.4	35	17 53	18 18	18 47	19 18	20 16	21 17	22 20
09	316	26.0		282	21.3	14.7		12	47.8	13.3	55.4	40	17 52	18 19	18 50	19 20	20 22	21 26	22 32
10	331	26.2		296	55.0	14.6		13	01.1	13.2	55.4	45	17 51	18 20	18 54	19 23	20 29	21 37	22 48
11	346	26.4		311	28.6	14.5		13	14.3	13.3	55.4	S 50	17 49	18 22	18 59	19 26	20 37	21 50	23 07
12	1	26.6	N 1	326	02.1	14.4	S13	27.6	13.1	55.4	52	17 49	18 23	19 02	19 28	20 41	21 57	23 16	
13	16	26.9		340	35.5	14.4		13	40.7	13.1	55.5	54	17 48	18 24	19 05	19 29	20 45	22 04	23 26
14	31	27.1		355	08.9	14.3		13	53.8	13.1	55.5	56	17 48	18 25	19 08	19 31	20 50	22 11	23 37
15	46	27.3		9	42.2	14.2		14	06.9	13.0	55.5	58	17 47	18 26	19 12	19 33	20 55	22 20	23 50
16	61	27.5		24	15.4	14.2		14	19.9	13.0	55.5	S 60	17 46	18 28	19 17	19 35	21 01	22 30	24 06
17	76	27.8		38	48.6	14.1		14	32.9	12.9	55.5	SUN		MOON					
18	91	28.0	N 1	53	21.7	14.0	S14	45.8	12.9	55.6	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
19	106	28.2		67	54.7	13.9		14	58.7	12.8		00 ^h	12 ^h	Pass.	Upper	Lower			
20	1																		

UT		ARIES		VENUS −4.8		MARS +1.7		JUPITER −2.7		SATURN +0.5		STARS		
		GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
TUESDAY	1900	357 38.6	220 30.7 N11 25.9	164 03.3 S 5 18.3	314 27.6 N15 05.6	22 48.4 S12 21.9	Acamar	315 12.3 S40 12.3						
	01	12 41.1	235 31.8 25.9	179 04.2 19.0	329 30.2 05.5	37 51.0 21.9	Achernar	335 20.5 S57 06.8						
	02	27 43.5	250 33.0 25.9	194 05.2 19.6	344 32.7 05.5	52 53.7 22.0	Acru	173 02.0 S63 13.8						
	03	42 46.0	265 34.1 . . 25.9	209 06.1 . . 20.3	359 35.3 . . 05.4	67 56.3 . . 22.1	Adhara	255 06.8 S28 59.9						
	04	57 48.5	280 35.3 26.0	224 07.1 21.0	14 37.9 05.4	82 58.9 22.1	Aldebaran	290 40.8 N16 33.5						
	05	72 50.9	295 36.4 26.0	239 08.0 21.6	29 40.5 05.4	98 01.5 22.2								
	06	87 53.4	310 37.6 N11 26.0	254 09.0 S 5 22.3	44 43.1 N15 05.3	113 04.1 S12 22.2	Alioth	166 14.4 N55 50.0						
	07	102 55.8	325 38.7 26.0	269 09.9 22.9	59 45.7 05.3	128 06.8 22.3	Alkaid	152 53.3 N49 11.9						
	08	117 58.3	340 39.9 26.0	284 10.9 23.6	74 48.2 05.2	143 09.4 22.4	Alnair	27 33.9 S46 50.8						
	09	133 00.8	355 41.0 . . 26.0	299 11.8 . . 24.2	89 50.8 . . 05.2	158 12.0 . . 22.4	Alnilam	275 38.8 S 1 11.0						
	10	148 03.2	10 42.1 26.0	314 12.8 24.9	104 53.4 05.1	173 14.6 22.5	Alphard	217 49.1 S 8 45.5						
	11	163 05.7	25 43.3 26.0	329 13.7 25.6	119 56.0 05.1	188 17.3 22.5								
	12	178 08.2	40 44.4 N11 26.0	344 14.7 S 5 26.2	134 58.6 N15 05.1	203 19.9 S12 22.6	Alphecca	126 04.9 N26 38.3						
	13	193 10.6	55 45.5 26.0	359 15.6 26.9	150 01.2 05.0	218 22.5 22.6	Alpheratz	357 35.6 N29 13.3						
	14	208 13.1	70 46.7 26.0	14 16.6 27.5	165 03.7 05.0	233 25.1 22.7	Altair	62 00.9 N 8 56.0						
	15	223 15.6	85 47.8 . . 26.0	29 17.5 . . 28.2	180 06.3 . . 04.9	248 27.7 . . 22.8	Ankaa	353 07.8 S42 10.5						
	16	238 18.0	100 48.9 26.0	44 18.5 28.8	195 08.9 04.9	263 30.4 22.8	Antares	112 17.3 S26 29.1						
	17	253 20.5	115 50.0 26.0	59 19.4 29.5	210 11.5 04.8	278 33.0 22.9								
	18	268 23.0	130 51.1 N11 26.0	74 20.4 S 5 30.1	225 14.1 N15 04.8	293 35.6 S12 22.9	Arcturus	145 49.2 N19 03.7						
	19	283 25.4	145 52.3 26.0	89 21.3 30.8	240 16.7 04.8	308 38.2 23.0	Atria	107 12.6 S69 04.4						
	20	298 27.9	160 53.4 26.0	104 22.3 31.5	255 19.3 04.7	323 40.8 23.1	Avior	234 15.6 S59 34.8						
	21	313 30.3	175 54.5 . . 26.0	119 23.2 . . 32.1	270 21.9 . . 04.7	338 43.5 . . 23.1	Bellatrix	278 24.0 N 6 22.4						
	22	328 32.8	190 55.6 26.0	134 24.2 32.8	285 24.4 04.6	353 46.1 23.2	Betelgeuse	270 53.3 N 7 24.8						
	23	343 35.3	205 56.7 26.0	149 25.1 33.4	300 27.0 04.6	8 48.7 23.2								
WEDNESDAY	2000	358 37.7	220 57.8 N11 26.0	164 26.1 S 5 34.1	315 29.6 N15 04.5	23 51.3 S12 23.3	Canopus	263 53.0 S52 42.1						
	01	13 40.2	235 58.9 26.0	179 27.0 34.7	330 32.2 04.5	38 53.9 23.3	Capella	280 23.5 N46 01.2						
	02	28 42.7	251 00.0 26.0	194 28.0 35.4	345 34.8 04.5	53 56.6 23.4	Deneb	49 26.3 N45 22.1						
	03	43 45.1	266 01.1 . . 26.0	209 28.9 . . 36.1	0 37.4 . . 04.4	68 59.2 . . 23.5	Denebola	182 26.4 N14 26.6						
	04	58 47.6	281 02.2 26.0	224 29.8 36.7	15 40.0 04.4	84 01.8 23.5	Diphda	348 48.1 S17 51.3						
	05	73 50.1	296 03.3 26.0	239 30.8 37.4	30 42.6 04.3	99 04.4 23.6								
	06	88 52.5	311 04.3 N11 26.0	254 31.7 S 5 38.0	45 45.2 N15 04.3	114 07.0 S12 23.6	Dubhe	193 43.0 N61 37.5						
	07	103 55.0	326 05.4 25.9	269 32.7 38.7	60 47.8 04.2	129 09.6 23.7	Elnath	278 03.2 N28 37.6						
	08	118 57.4	341 06.5 25.9	284 33.6 39.3	75 50.3 04.2	144 12.3 23.7	Eltanin	90 42.7 N51 29.4						
	09	133 59.9	356 07.6 . . 25.9	299 34.6 . . 40.0	90 52.9 . . 04.2	159 14.9 . . 23.8	Enif	33 39.6 N 9 59.1						
	10	149 02.4	11 08.7 25.9	314 35.5 40.6	105 55.5 04.1	174 17.5 23.9	Fomalhaut	15 15.4 S29 29.8						
	11	164 04.8	26 09.7 25.9	329 36.5 41.3	120 58.1 04.1	189 20.1 23.9								
	12	179 07.3	41 10.8 N11 25.9	344 37.4 S 5 42.0	136 00.7 N15 04.0	204 22.7 S12 24.0	Gacrux	171 53.5 S57 14.7						
	13	194 09.8	56 11.9 25.8	359 38.4 42.6	151 03.3 04.0	219 25.4 24.0	Gienah	175 45.1 S17 40.2						
	14	209 12.2	71 13.0 25.8	14 39.3 43.3	166 05.9 03.9	234 28.0 24.1	Hadar	148 38.1 S60 29.3						
	15	224 14.7	86 14.0 . . 25.8	29 40.3 . . 43.9	181 08.5 . . 03.9	249 30.6 . . 24.1	Hamal	327 52.2 N23 34.5						
	16	239 17.2	101 15.1 25.8	44 41.2 44.6	196 11.1 03.8	264 33.2 24.2	Kaus Aust.	83 33.9 S34 22.5						
	17	254 19.6	116 16.1 25.8	59 42.2 45.2	211 13.7 03.8	279 35.8 24.3								
	18	269 22.1	131 17.2 N11 25.7	74 43.1 S 5 45.9	226 16.3 N15 03.7	294 38.4 S12 24.3	Kochab	137 20.5 N74 03.7						
	19	284 24.6	146 18.3 25.7	89 44.0 46.5	241 18.9 03.7	309 41.1 24.4	Markab	13 30.7 N15 20.1						
	20	299 27.0	161 19.3 25.7	104 45.0 47.2	256 21.5 03.7	324 43.7 24.4	Menkar	314 07.1 N 4 11.1						
	21	314 29.5	176 20.4 . . 25.7	119 45.9 . . 47.9	271 24.1 . . 03.6	339 46.3 . . 24.5	Menkent	147 59.3 S36 29.2						
	22	329 31.9	191 21.4 25.6	134 46.9 48.5	286 26.7 03.6	354 48.9 24.5	Miaplacidus	221 39.3 S69 48.5						
	23	344 34.4	206 22.4 25.6	149 47.8 49.2	301 29.3 03.5	9 51.5 24.6								
THURSDAY	2100	359 36.9	221 23.5 N11 25.6	164 48.8 S 5 49.8	316 31.9 N15 03.5	24 54.2 S12 24.7	Mirfak	308 29.6 N49 56.6						
	01	14 39.3	236 24.5 25.5	179 49.7 50.5	331 34.4 03.4	39 56.8 24.7	Nunki	75 49.0 S26 16.1						
	02	29 41.8	251 25.6 25.5	194 50.7 51.1	346 37.0 03.4	54 59.4 24.8	Peacock	53 07.1 S56 39.7						
	03	44 44.3	266 26.6 . . 25.5	209 51.6 . . 51.8	1 39.6 . . 03.3	70 02.0 . . 24.8	Pollux	243 18.8 N27 58.2						
	04	59 46.7	281 27.6 25.4	224 52.5 52.4	16 42.2 03.3	85 04.6 24.9	Procyon	244 52.1 N 5 10.0						
	05	74 49.2	296 28.7 25.4	239 53.5 53.1	31 44.8 03.2	100 07.2 24.9								
	06	89 51.7	311 29.7 N11 25.4	254 54.4 S 5 53.8	46 47.4 N15 03.2	115 09.9 S12 25.0	Rasalhague	95 59.6 N12 32.7						
	07	104 54.1	326 30.7 25.3	269 55.4 54.4	61 50.0 03.2	130 12.5 25.1	Regulus	207 35.9 N11 51.2						
	08	119 56.6	341 31.7 25.3	284 56.3 55.1	76 52.6 03.1	145 15.1 25.1	Rigel	281 04.9 S 8 10.2						
	09	134 59.1	356 32.8 . . 25.3	299 57.3 . . 55.7	91 55.2 . . 03.1	160 17.7 . . 25.2	Rigel Kent.	139 42.3 S60 56.0						
	10	150 01.5	11 33.8 25.2	314 58.2 56.4	106 57.8 03.0	175 20.3 25.2	Sabik	102 04.1 S15 45.2						
	11	165 04.0	26 34.8 25.2	329 59.2 57.0	122 00.4 03.0	190 22.9 25.3								
	12	180 06.4	41 35.8 N11 25.2	345 00.1 S 5 57.7	137 03.0 N15 02.9	205 25.6 S12 25.3	Schedar	349 31.8 N56 40.0						
	13	195 08.9	56 36.8 25.1	0 01.0 58.3	152 05.6 02.9	220 28.2 25.4	Shaula	96 11.9 S37 07.3						
	14	210 11.4	71 37.8 25.1	15 02.0 59.0	167 08.2 02.8	235 30.8 25.5	Sirius	258 27.3 S16 44.6						
	15	225 13.8	86 38.8 . . 25.0	30 02.9 5 59.6	182 10.8 . . 02.8	250 33.4 . . 25.5	Spica	158 23.8 S11 17.0						
	16	240 16.3	101 39.9 25.0	45 03.9 6 00.3	197 13.4 02.7	265 36.0 25.6	Suhail	222 47.5 S43 31.4						
	17	255 18.8	116 40.9 24.9	60 04.8 01.0	212 16.0 02.7	280 38.6 25.6								
	18	270 21.2	131 41.9 N11 24.9	75 05.8 S 6 01.6	227 18.7 N15 02.6	295 41.3 S12 25.7	Vega	80 33.9 N38 48.6						
	19	285 23.7	146 42.9 24.8	90 06.7 02.3	242 21.3 02.6	310 43.9 25.7	Zuben'ubi	136 57.5 S16 08.3						
	20	300 26.2	161 43.9 24.8	105 07.6 02.9	257 23.9 02.5	325 46.5 25.8								
	21	315 28.6	176 44.8 . . 24.7	120 08.6 . . 03.6	272 26.5 . . 02.5	340 49.1 . . 25.8								
	22	330 31.1	191 45.8 24.7	135 09.5 04.2	287 29.1 02.4	355 51.7 25.9	Venus	222 20.1 9 15						
	23	345 33.6	206 46.8 24.6	150 10.5 04.9	302 31.7 02.4	10 54.3 26.0	Mars	165 48.3 13 01						
		h m												
Mer.Pass.		0 05.5	γ 1.1 d 0.0	γ 0.9 d 0.7	γ 2.6 d 0.0	γ 2.6 d 0.1	Saturn	25 13.6 22 21						

UT	SUN		MOON					Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	ν	Dec	d	HP		Naut.	Civil		19	20	21	22	
d h	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	°	h m	h m	h m	h m	h m	h m	h m	h m
1900	181	29.3 N 1	140	38.4	13.5	S16	02.2 12.5	55.7	N 72	02 43	04 19	05 28				
	01	196 29.5	155	10.9	13.5		16 14.7 12.4	55.7	N 70	03 06	04 28	05 31	13 44			
	02	211 29.8	37.9	169	43.4	13.3	16 27.1 12.4	55.7	68	03 24	04 36	05 33	12 50			
	03	226 30.0	37.0	184	15.7	13.3	16 39.5 12.4	55.8	66	03 38	04 43	05 35	12 17	14 56		
	04	241 30.2	36.0	198	48.0	13.1	16 51.9 12.2	55.8	64	03 49	04 48	05 36	11 54	13 57		
05	256 30.4	35.0	213	20.1	13.1	17 04.1 12.2	55.8	62	03 58	04 53	05 38	11 35	13 24	15 25		
06	271 30.6 N 1	34.1	227	52.2	13.0	S17	16.3 12.1	55.8	60	04 06	04 57	05 39	11 20	12 59	14 43	16 18
07	286 30.9	33.1	242	24.2	12.9	17 28.4 12.1	55.8	N 58	04 13	05 00	05 40	11 07	12 40	14 14	15 39	
08	301 31.1	32.1	256	56.1	12.8	17 40.5 12.0	55.9	56	04 19	05 03	05 41	10 56	12 24	13 52	15 12	
09	316 31.3	31.2	271	27.9	12.7	17 52.5 11.9	55.9	54	04 24	05 06	05 41	10 46	12 10	13 34	14 51	
10	331 31.5	30.2	285	59.6	12.7	18 04.4 11.9	55.9	52	04 28	05 08	05 42	10 38	11 58	13 19	14 33	
11	346 31.8	29.2	300	31.3	12.5	18 16.3 11.8	55.9	50	04 32	05 10	05 43	10 30	11 48	13 05	14 18	
12	1 32.0 N 1	28.2	315	02.8	12.4	S18	28.1 11.7	56.0	45	04 40	05 15	05 44	10 14	11 26	12 38	13 48
13	16 32.2	27.3	329	34.2	12.4	18 39.8 11.6	56.0	N 40	04 46	05 18	05 45	10 00	11 08	12 17	13 24	
14	31 32.4	26.3	344	05.6	12.2	18 51.4 11.5	56.0	35	04 51	05 21	05 46	09 49	10 53	11 59	13 05	
15	46 32.7	25.3	358	36.8	12.2	19 02.9 11.5	56.0	30	04 55	05 23	05 47	09 39	10 41	11 44	12 48	
16	61 32.9	24.4	13	08.0	12.1	19 14.4 11.4	56.1	20	05 01	05 26	05 48	09 22	10 19	11 19	12 20	
17	76 33.1	23.4	27	39.1	11.9	19 25.8 11.3	56.1	N 10	05 04	05 28	05 49	09 08	10 00	10 57	11 56	
18	91 33.3 N 1	22.4	42	10.0	11.9	S19	37.1 11.2	56.1	0	05 06	05 30	05 50	08 54	09 43	10 36	11 34
19	106 33.5	21.5	56	40.9	11.8	19 48.3 11.1	56.1	S 10	05 06	05 30	05 51	08 41	09 26	10 16	11 12	
20	121 33.8	20.5	71	11.7	11.6	19 59.4 11.1	56.1	20	05 04	05 30	05 52	08 27	09 08	09 54	10 48	
21	136 34.0	19.5	85	42.3	11.6	20 10.5 11.0	56.2	30	05 01	05 29	05 52	08 11	08 47	09 29	10 20	
22	151 34.2	18.5	100	12.9	11.5	20 21.5 10.9	56.2	35	04 58	05 28	05 53	08 01	08 35	09 15	10 04	
23	166 34.4	17.6	114	43.4	11.3	20 32.4 10.7	56.2	40	04 55	05 26	05 53	07 51	08 21	08 58	09 45	
								45	04 50	05 24	05 54	07 38	08 04	08 38	09 22	
2000	181	34.7 N 1	129	13.7	11.3	S20	43.1 10.7	56.2	S 50	04 44	05 22	05 54	07 23	07 44	08 12	08 53
	01	196 34.9	15.6	143	44.0 11.1	20 53.8 10.6	56.3	52	04 41	05 21	05 54	07 16	07 34	08 00	08 39	
	02	211 35.1	14.7	158	14.1 11.1	21 04.4 10.6	56.3	54	04 38	05 19	05 54	07 09	07 24	07 46	08 22	
	03	226 35.3	13.7	172	44.2 11.0	21 15.0 10.4	56.3	56	04 34	05 18	05 55	07 00	07 12	07 30	08 02	
	04	241 35.5	12.7	187	14.2 10.8	21 25.4 10.3	56.3	58	04 30	05 16	05 55	06 50	06 58	07 11	07 38	
05	256 35.8	11.8	201	44.0 10.7	21 35.7 10.2	56.4		S 60	04 24	05 14	05 55	06 39	06 42	06 48	07 05	
06	271 36.0 N 1	10.8	216	13.7 10.7	S21	45.9 10.2	56.4	Lat.	Sunset	Twilight		Moonset				
07	286 36.2	09.8	230	43.4 10.5	21 56.1 10.0	56.4	Civil			Naut.	19	20	21	22		
08	301 36.4	08.8	245	12.9 10.5	22 06.1 9.9	56.4	°	h m	h m	h m	h m	h m	h m	h m	h m	
09	316 36.7	07.9	259	42.4 10.3	22 16.0 9.8	56.5										
10	331 36.9	06.9	274	11.7 10.2	22 25.8 9.7	56.5	N 72	18 16	19 25	20 59						
11	346 37.1	05.9	288	40.9 10.1	22 35.5 9.6	56.5	N 70	18 14	19 16	20 37	16 07					
12	1 37.3 N 1	05.0	303	10.0 10.0	S22	45.1 9.6	56.5	68	18 12	19 08	20 20	17 03				
13	16 37.5	04.0	317	39.0 9.9	22 54.7 9.3	56.6	66	18 10	19 02	20 06	17 37	16 42				
14	31 37.8	03.0	332	07.9 9.8	23 04.0 9.3	56.6	64	18 09	18 57	19 56	18 02	17 41				
15	46 38.0	02.0	346	36.7 9.7	23 13.3 9.2	56.6	62	18 08	18 52	19 47	18 22	18 16	18 07			
16	61 38.2	01.1	1 05.4 9.6	23 22.5 9.1	56.7		60	18 07	18 49	19 39	18 38	18 41	18 50	19 16		
17	76 38.4	1 00.1	15 34.0 9.4	23 31.6 8.9	56.7		N 58	18 06	18 45	19 33	18 51	19 01	19 19	19 55		
18	91 38.7 N 0	59.1	30 02.4 9.4	S23	40.5 8.8	56.7	56	18 05	18 42	19 27	19 03	19 17	19 41	20 22		
19	106 38.9	58.2	44 30.8 9.3	23 49.3 8.7	56.7		54	18 05	18 40	19 22	19 14	19 32	19 59	20 43		
20	121 39.1	57.2	58 59.1 9.1	23 58.0 8.6	56.8		52	18 04	18 38	19 18	19 23	19 44	20 15	21 01		
21	136 39.3	56.2	73 27.2 9.0	24 06.6 8.5	56.8		50	18 03	18 36	19 14	19 31	19 55	20 29	21 16		
22	151 39.5	55.3	87 55.2 9.0	24 15.1 8.4	56.8		45	18 02	18 31	19 06	19 49	20 18	20 56	21 47		
23	166 39.8	54.3	102 23.2 8.8	24 23.5 8.2	56.8		N 40	18 01	18 28	19 00	20 04	20 37	21 18	22 11		
2100	181	40.0 N 0	116	51.0 8.7	S24	31.7 8.1	56.9	35	18 00	18 26	18 55	20 16	20 52	21 36	22 30	
	01	196 40.2	52.3	131	18.7 8.6	24 39.8 8.0	56.9	30	18 00	18 23	18 51	20 27	21 06	21 52	22 47	
	02	211 40.4	51.4	145	46.3 8.5	24 47.8 7.8	56.9	20	17 58	18 20	18 46	20 46	21 29	22 19	23 16	
	03	226 40.7	50.4	160	13.8 8.4	24 55.6 7.7	57.0	N 10	17 58	18 18	18 43	21 02	21 49	22 42	23 40	
	04	241 40.9	49.4	174	41.2 8.3	25 03.3 7.6	57.0	0	17 57	18 17	18 41	21 17	22 08	23 03	24 03	
05	256 41.1	48.5	189	08.5 8.2	25 10.9 7.5	57.0	S 10	17 56	18 17	18 41	21 33	22 27	23 25	24 25		
06	271 41.3 N 0	47.5	203	35.7 8.1	S25	18.4 7.3	57.0	20	17 56	18 18	18 43	21 49	22 47	23 48	24 50	
07	286 41.5	46.5	218	02.8 8.0	25 25.7 7.2	57.1	30	17 55	18 19	18 47	22 08	23 11	24 15	00 15		
08	301 41.8	45.5	232	29.8 7.9	25 32.9 7.0	57.1	35	17 55	18 20	18 49	22 20	23 25	24 31	00 31		
09	316 42.0	44.6	246	56.7 7.7	25 39.9 7.0	57.1	40	17 54	18 21	18 53	22 32	23 41	24 49	00 49		
10	331 42.2	43.6	261	23.4 7.7	25 46.9 6.7	57.2	45	17 54	18 23	18 58	22 48	24 00	00 00	01 12		
11	346 42.4	42.6	275	50.1 7.5	25 53.6 6.7	57.2	S 50	17 54	18 26	19 04	23 07	24 25	00 25	01 40		
12	1 42.6 N 0	41.7	290	16.6 7.5	S26	00.3 6.5	57.2	52	17 54	18 27	19 07	23 16	24 36	00 36	01 55	
13	16 42.9	40.7	304	43.1 7.4	26 06.8 6.3	57.2	54	17 54	18 29	19 11	23 26	24 50	00 50	02 11		
14	31 43.1	39.7	319	09.5 7.2	26 13.1 6.2	57.3	56	17 54	18 31	19 15	23 37	25 05	01 05	02 30		
15	46 43.3	38.7	333	35.7 7.2	26 19.3 6.1	57.3	58	17 53	18 33	19 19	23 50	25 24	01 24	02 55		
16	61 43.5	37.8	348	01.9 7.0	26 25.4 5.9	57.3	S 60	17 53	18 35	19 24	24 06	00 06	01 47	03 27		
17	76 43.8	36.8	2 27.9 7.0	26 31.3 5.8	57.4		Day	SUN		MOON						
18	91 44.0 N 0	35.8	16 53.9 6.9	S26	37.1 5.6	57.4		Eqn. of Time	Mer.	Mer. Pass.		Age		Phase		
19	106 44.2	34.8	31 19.8 6.7	26 42.7 5.4	57.4		00 ^h	12 ^h	Pass.	Upper	Lower	d	%			
20	121 44.4	33.9	45 45.5 6.7	26 48.1 5.4	57.5		19	05 57	06 07	11 54	15 06	02 42	04 18			
21	136 44.6	32.9	60 11.2 6.6	26 53.5 5.1	57.5		20	06 18	06 29	11 54	15 55	03 30	05 26			
22	151 44.9	31.9	74 36.8 6.5	26 58.6 5.0	57.5		21	06 39	06 50	11 53	16 50	04 22	06 36			
23	166 45.1	31.0	89 02.3 6.4	S27	03.6 4.9	57.5		SD								



UT	ARIES	VENUS	−4.7	MARS	+1.7	JUPITER	−2.8	SATURN	+0.5	STARS				
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec		
F R I D A Y	22 00	0 36.0	221 47.8	N11 24.6	165 11.4	S 6 05.5	317 34.3	N15 02.4	25 56.9	S12 26.0	Acamar	315 12.3	S40 12.3	
	01	15 38.5	236 48.8	24.5	180 12.3	06.2	332 36.9	02.3	40 59.6	26.1	Achernar	335 20.4	S57 06.8	
	02	30 40.9	251 49.8	24.5	195 13.3	06.8	347 39.5	02.3	56 02.2	26.1	Acrux	173 02.0	S63 13.8	
	03	45 43.4	266 50.8	.. 24.0	210 14.2	.. 07.5	2 42.1	.. 02.2	71 04.8	.. 26.2	Adhara	255 06.8	S28 59.9	
	04	60 45.9	281 51.7	24.4	225 15.2	08.2	17 44.7	02.2	86 07.4	26.2	Aldebaran	290 40.7	N16 33.5	
	05	75 48.3	296 52.7	24.3	240 16.1	08.8	32 47.3	02.1	101 10.0	26.3				
	06	90 50.8	311 53.7	N11 24.3	255 17.1	S 6 09.5	47 49.9	N15 02.1	116 12.6	S12 26.3	Alioth	166 14.4	N55 50.0	
	07	105 53.3	326 54.7	24.2	270 18.0	10.1	62 52.5	02.0	131 15.2	26.4	Alkaid	152 53.3	N49 11.9	
	08	120 55.7	341 55.6	24.1	285 18.9	10.8	77 55.1	02.0	146 17.9	26.5	Alnair	27 33.9	S46 50.8	
	09	135 58.2	356 56.6	.. 24.1	300 19.9	.. 11.4	92 57.7	.. 01.9	161 20.5	.. 26.5	Alnilam	275 38.8	S 1 11.0	
	10	151 00.7	11 57.6	24.0	315 20.8	12.1	108 00.3	01.9	176 23.1	26.6	Alphard	217 49.1	S 8 45.5	
	11	166 03.1	26 58.5	24.0	330 21.8	12.7	123 02.9	01.8	191 25.7	26.6				
	12	181 05.6	41 59.5	N11 23.9	345 22.7	S 6 13.4	138 05.6	N15 01.8	206 28.3	S12 26.7	Alphecca	126 04.9	N26 38.3	
	13	196 08.0	57 00.4	23.8	0 23.6	14.0	153 08.2	01.7	221 30.9	26.7	Alpheratz	357 35.6	N29 13.4	
	14	211 10.5	72 01.4	23.8	15 24.6	14.7	168 10.8	01.7	236 33.5	26.8	Altair	62 00.9	N 8 56.0	
	15	226 13.0	87 02.3	.. 23.7	30 25.5	.. 15.3	183 13.4	.. 01.6	251 36.2	.. 26.8	Ankaa	353 07.8	S42 10.5	
	16	241 15.4	102 03.3	23.6	45 26.5	16.0	198 16.0	01.6	266 38.8	26.9	Antares	112 17.3	S26 29.1	
	17	256 17.9	117 04.2	23.6	60 27.4	16.7	213 18.6	01.5	281 41.4	27.0				
	18	271 20.4	132 05.2	N11 23.5	75 28.3	S 6 17.3	228 21.2	N15 01.5	296 44.0	S12 27.0	Arcturus	145 49.2	N19 03.7	
	19	286 22.8	147 06.1	23.4	90 29.3	18.0	243 23.8	01.4	311 46.6	27.1	Atria	107 12.7	S69 04.4	
	20	301 25.3	162 07.1	23.4	105 30.2	18.6	258 26.4	01.4	326 49.2	27.1	Avior	234 15.6	S59 34.7	
	21	316 27.8	177 08.0	.. 23.3	120 31.2	.. 19.3	273 29.0	.. 01.3	341 51.8	.. 27.2	Bellatrix	278 24.0	N 6 22.4	
	22	331 30.2	192 09.0	23.2	135 32.1	19.9	288 31.7	01.3	356 54.5	27.2	Betelgeuse	270 53.3	N 7 24.8	
	23	346 32.7	207 09.9	23.1	150 33.0	20.6	303 34.3	01.2	11 57.1	27.3				
S A T U R D A Y	23 00	1 35.2	222 10.8	N11 23.1	165 34.0	S 6 21.2	318 36.9	N15 01.2	26 59.7	S12 27.3	Canopus	263 52.9	S52 42.1	
	01	16 37.6	237 11.8	23.0	180 34.9	21.9	333 39.5	01.1	42 02.3	27.4	Capella	280 23.4	N46 01.2	
	02	31 40.1	252 12.7	22.9	195 35.8	22.5	348 42.1	01.1	57 04.9	27.4	Deneb	49 26.3	N45 22.1	
	03	46 42.5	267 13.6	.. 22.8	210 36.8	.. 23.2	3 44.7	.. 01.0	72 07.5	.. 27.5	Denebola	182 26.4	N14 26.5	
	04	61 45.0	282 14.5	22.8	225 37.7	23.8	18 47.3	01.0	87 10.1	27.6	Diphda	348 48.1	S17 51.3	
	05	76 47.5	297 15.5	22.7	240 38.7	24.5	33 49.9	00.9	102 12.7	27.6				
	06	91 49.9	312 16.4	N11 22.6	255 39.6	S 6 25.1	48 52.6	N15 00.9	117 15.4	S12 27.7	Dubhe	193 42.9	N61 37.4	
	07	106 52.4	327 17.3	22.5	270 40.5	25.8	63 55.2	00.8	132 18.0	27.7	Elnath	278 03.2	N28 37.6	
	08	121 54.9	342 18.2	22.4	285 41.5	26.4	78 57.8	00.8	147 20.6	27.8	Eltanin	90 42.7	N51 29.4	
	09	136 57.3	357 19.1	.. 22.4	300 42.4	.. 27.1	94 00.4	.. 00.7	162 23.2	.. 27.8	Enif	33 39.6	N 9 59.1	
	10	151 59.8	12 20.0	22.3	315 43.3	27.8	109 03.0	00.7	177 25.8	27.9	Fomalhaut	15 15.4	S29 29.8	
	11	167 02.3	27 20.9	22.2	330 44.3	28.4	124 05.6	00.6	192 28.4	27.9				
	12	182 04.7	42 21.9	N11 22.1	345 45.2	S 6 29.1	139 08.3	N15 00.6	207 31.0	S12 28.0	Gacrux	171 53.5	S57 14.7	
	13	197 07.2	57 22.8	22.0	0 46.2	29.7	154 10.9	00.5	222 33.6	28.0	Gienah	175 45.0	S17 40.2	
	14	212 09.7	72 23.7	21.9	15 47.1	30.4	169 13.5	00.5	237 36.2	28.1	Hadar	148 38.1	S60 29.3	
	15	227 12.1	87 24.6	.. 21.8	30 48.0	.. 31.0	184 16.1	.. 00.4	252 38.9	.. 28.2	Hamal	327 52.1	N23 34.5	
	16	242 14.6	102 25.5	21.7	45 49.0	31.7	199 18.7	00.4	267 41.5	28.2	Kaus Aust.	83 33.9	S34 22.5	
	17	257 17.0	117 26.4	21.6	60 49.9	32.3	214 21.3	00.3	282 44.1	28.3				
	18	272 19.5	132 27.3	N11 21.6	75 50.8	S 6 33.0	229 24.0	N15 00.3	297 46.7	S12 28.3	Kochab	137 20.6	N74 03.7	
	19	287 22.0	147 28.1	21.5	90 51.8	33.6	244 26.6	00.2	312 49.3	28.4	Markab	13 30.7	N15 20.1	
	20	302 24.4	162 29.0	21.4	105 52.7	34.3	259 29.2	00.2	327 51.9	28.4	Menkar	314 07.1	N 4 11.1	
	21	317 26.9	177 29.9	.. 21.3	120 53.6	.. 34.9	274 31.8	.. 00.1	342 54.5	.. 28.5	Menkent	147 59.3	S36 29.2	
	22	332 29.4	192 30.8	21.2	135 54.6	35.6	289 34.4	00.1	357 57.1	28.5	Miaplacidus	221 39.2	S69 48.5	
	23	347 31.8	207 31.7	21.1	150 55.5	36.2	304 37.1	15 00.0	12 59.7	28.6				
S U N D A Y	24 00	2 34.3	222 32.6	N11 21.0	165 56.4	S 6 36.9	319 39.7	N14 59.9	28 02.4	S12 28.6	Mirfak	308 29.5	N49 56.6	
	01	17 36.8	237 33.5	20.9	180 57.4	37.5	334 42.3	59.9	43 05.0	28.7	Nunki	75 49.0	S26 16.1	
	02	32 39.2	252 34.3	20.8	195 58.3	38.2	349 44.9	59.8	58 07.6	28.7	Peacock	53 07.1	S56 39.7	
	03	47 41.7	267 35.2	.. 20.7	210 59.3	.. 38.8	4 47.5	.. 59.8	73 10.2	.. 28.8	Pollux	243 18.8	N27 58.2	
	04	62 44.2	282 36.1	20.6	226 00.2	39.5	19 50.2	59.7	88 12.8	28.9	Procyon	244 52.1	N 5 10.0	
	05	77 46.6	297 37.0	20.5	241 01.1	40.1	34 52.8	59.7	103 15.4	28.9				
	06	92 49.1	312 37.8	N11 20.4	256 02.1	S 6 40.8	49 55.4	N14 59.6	118 18.0	S12 29.0	Rasalhague	95 59.6	N12 32.7	
	07	107 51.5	327 38.7	20.3	271 03.0	41.4	64 58.0	59.6	133 20.6	29.0	Regulus	207 35.9	N11 51.2	
	08	122 54.0	342 39.6	20.2	286 03.9	42.1	80 00.6	59.5	148 23.2	29.1	Rigel	281 04.8	S 8 10.2	
	09	137 56.5	357 40.4	.. 20.1	301 04.9	.. 42.8	95 03.3	.. 59.5	163 25.8	.. 29.1	Rigel Kent.	139 42.3	S60 56.0	
	10	152 58.9	12 41.3	20.0	316 05.8	43.4	110 05.9	59.4	178 28.5	29.2	Sabik	102 04.1	S15 45.2	
	11	168 01.4	27 42.1	19.8	331 06.7	44.1	125 08.5	59.4	193 31.1	29.2				
	12	183 03.9	42 43.0	N11 19.7	346 07.7	S 6 44.7	140 11.1	N14 59.3	208 33.7	S12 29.3	Schedar	349 31.8	N56 40.0	
	13	198 06.3	57 43.9	19.6	1 08.6	45.4	155 13.8	59.3	223 36.3	29.3	Shaula	96 11.9	S37 07.3	
	14	213 08.8	72 44.7	19.5	16 09.5	46.0	170 16.4	59.2	238 38.9	29.4	Sirius	258 27.3	S16 44.6	
	15	228 11.3	87 45.6	.. 19.4	31 10.5	.. 46.7	185 19.0	.. 59.2	253 41.5	.. 29.4	Spica	158 23.8	S11 17.0	
	16	243 13.7	102 46.4	19.3	46 11.4	47.3	200 21.6	59.1	268 44.1	29.5	Suhail	222 47.4	S43 31.4	
	17	258 16.2	117 47.2	19.2	61 12.3	48.0	215 24.3	59.0	283 46.7	29.5				
	18	273 18.7	132 48.1	N11 19.1	76 13.3	S 6 48.6	230 26.9	N14 59.0	298 49.3	S12 29.6	Vega	80 33.9	N38 48.6	
	19	288 21.1	147 48.9	18.9	91 14.2	49.3	245 29.5	58.9	313 51.9	29.6	Zuben'ubi	136 57.5	S16 08.3	
	20	303 23.6	162 49.8	18.8	106 15.1	49.9	260 32.1	58.9	328 54.5	29.7				
	21	318 26.0	177 50.6	.. 18.7	121 16.0	.. 50.6	275 34.8	.. 58.8	343 57.2	.. 29.8				
	22	333 28.5	192 51.5	18.6	136 17.0	51.2	290 37.4	58.8	358 59.8	29.8				
	23	348 31.0	207 52.3	18.5	151 17.9	51.9	305 40.0	58.7	14 02.4	29.9				
h m														
Mer.Pass. 23 49.7		v 0.9	d 0.1			v 0.9	d 0.7	v 2.6	d 0.1	v 2.6	d 0.1			
												SHA	Mer.Pass.	
												Venus	220 35.7	h m
												Mars	163 58.8	12 57
												Jupiter	317 01.7	2 45
												Saturn	25 24.5	22 08

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	22	23	24	25
FRI DAY	d h	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	N 72	h m	h m	h m	h m	h m	h m	h m	h m
	00	181 45.3 N 0 30.0	103 27.7 6.3	S27 08.5 4.6	57.6	N 70	03 22 04 41 05 43	■	■	■	■						
	01	196 45.5 29.0	117 53.0 6.2	27 13.1 4.6	57.6	68	03 37 04 47 05 43	■	■	■	20 30						
	02	211 45.7 28.0	132 18.2 6.1	27 17.7 4.3	57.6	66	03 49 04 53 05 44	■	■	■	19 12						
	03	226 46.0 27.1	146 43.3 6.1	27 22.0 4.3	57.7	64	03 59 04 57 05 45	■	■	■	19 31						
	04	241 46.2 26.1	161 08.4 5.9	27 26.3 4.0	57.7	62	04 07 05 01 05 45	■	■	■	18 15						
	05	256 46.4 25.1	175 33.3 5.9	27 30.3 3.9	57.7	60	04 14 05 04 05 46	16 18	17 17	17 38	17 46						
	06	271 46.6 N 0 24.2	189 58.2 5.8	S27 34.2 3.7	57.8	N 58	04 20 05 07 05 46	15 39	16 40	17 12	17 29						
	07	286 46.8 23.2	204 23.0 5.7	27 37.9 3.5	57.8	56	04 25 05 09 05 46	15 12	16 13	16 51	17 14						
	08	301 47.1 22.2	218 47.7 5.6	27 41.4 3.4	57.8	54	04 29 05 11 05 47	14 51	15 52	16 34	17 01						
	09	316 47.3 21.2	233 12.3 5.5	27 44.8 3.2	57.8	52	04 33 05 13 05 47	14 33	15 35	16 19	16 50						
	10	331 47.5 20.3	247 36.8 5.5	27 48.0 3.1	57.9	50	04 37 05 15 05 47	14 18	15 20	16 06	16 40						
	11	346 47.7 19.3	262 01.3 5.4	27 51.1 2.9	57.9	45	04 44 05 18 05 48	13 48	14 49	15 40	16 19						
	12	1 48.0 N 0 18.3	276 25.7 5.3	S27 54.0 2.7	57.9	N 40	04 49 05 21 05 48	13 24	14 26	15 18	16 02						
	13	16 48.2 17.3	290 50.0 5.3	27 56.7 2.5	58.0	35	04 54 05 23 05 48	13 05	14 06	15 01	15 47						
	14	31 48.4 16.4	305 14.3 5.2	27 59.2 2.3	58.0	30	04 57 05 25 05 49	12 48	13 50	14 45	15 35						
	15	46 48.6 15.4	319 38.5 5.1	28 01.5 2.2	58.0	20	05 01 05 27 05 49	12 20	13 21	14 19	15 13						
	16	61 48.8 14.4	334 02.6 5.0	28 03.7 2.0	58.1	N 10	05 04 05 28 05 49	11 56	12 57	13 57	14 54						
	17	76 49.1 13.5	348 26.6 5.0	28 05.7 1.9	58.1	0	05 05 05 29 05 49	11 34	12 34	13 36	14 36						
	18	91 49.3 N 0 12.5	2 50.6 4.9	S28 07.6 1.6	58.1	S 10	05 04 05 28 05 49	11 12	12 12	13 15	14 19						
	19	106 49.5 11.5	17 14.5 4.9	28 09.2 1.5	58.2	20	05 01 05 27 05 49	10 48	11 48	12 52	13 59						
	20	121 49.7 10.5	31 38.4 4.8	28 10.7 1.3	58.2	30	04 57 05 25 05 49	10 20	11 20	12 26	13 37						
	21	136 49.9 09.6	46 02.2 4.7	28 12.0 1.1	58.2	35	04 54 05 23 05 49	10 04	11 03	12 11	13 24						
	22	151 50.2 08.6	60 25.9 4.7	28 13.1 0.9	58.3	40	04 50 05 21 05 48	09 45	10 43	11 53	13 09						
	23	166 50.4 07.6	74 49.6 4.7	28 14.0 0.8	58.3	45	04 44 05 19 05 48	09 22	10 20	11 31	12 51						
SATURDAY	00	181 50.6 N 0 06.6	89 13.3 4.6	S28 14.8 0.5	58.3	S 50	04 37 05 15 05 47	08 53	09 49	11 03	12 29						
	01	196 50.8 05.7	103 36.9 4.5	28 15.3 0.4	58.3	52	04 34 05 14 05 47	08 39	09 34	10 49	12 18						
	02	211 51.0 04.7	118 00.4 4.5	28 15.7 0.2	58.4	54	04 30 05 12 05 47	08 22	09 17	10 34	12 06						
	03	226 51.3 03.7	132 23.9 4.4	28 15.9 0.1	58.4	56	04 26 05 10 05 47	08 02	08 56	10 15	11 52						
	04	241 51.5 02.8	146 47.3 4.5	28 16.0 0.2	58.4	58	04 20 05 07 05 46	07 38	08 29	09 52	11 35						
	05	256 51.7 01.8	161 10.8 4.3	28 15.8 0.4	58.5	S 60	04 15 05 04 05 46	07 05	07 52	09 22	11 15						
	06	271 51.9 N 0 00.8	175 34.1 4.4	S28 15.4 0.5	58.5	Lat.	Sunset	Twilight		Moonset							
	07	286 52.1 S 00.2	189 57.5 4.3	28 14.9 0.7	58.5			Civil	Naut.	22	23	24	25				
	08	301 52.4 01.1	204 20.8 4.2	28 14.2 0.9	58.6	h m	h m	h m	h m	h m	h m	h m					
	09	316 52.6 02.1	218 44.0 4.3	28 13.3 1.1	58.6	N 72	18 01 19 09 20 38	■	■	■	■						
	10	331 52.8 03.1	233 07.3 4.2	28 12.2 1.3	58.6	N 70	18 00 19 01 20 19	■	■	■	■						
	11	346 53.0 04.1	247 30.5 4.1	28 10.9 1.5	58.7	68	17 59 18 55 20 05	■	■	■	21 29						
	12	1 53.2 S 0 05.0	261 53.6 4.2	S28 09.4 1.7	58.7	66	17 59 18 50 19 53	■	■	■	22 46						
	13	16 53.5 06.0	276 16.8 4.1	28 07.7 1.8	58.7	64	17 58 18 46 19 44	■	■	■	23 23						
	14	31 53.7 07.0	290 39.9 4.1	28 05.9 2.1	58.8	62	17 58 18 42 19 36	■	■	■	23 49						
	15	46 53.9 07.9	305 03.0 4.1	28 03.8 2.2	58.8	60	17 58 18 39 19 29	19 16	20 25	22 12	24 09						
	16	61 54.1 08.9	319 26.1 4.1	28 01.6 2.4	58.8	N 58	17 58 18 37 19 23	19 55	21 02	22 38	24 25						
	17	76 54.3 09.9	333 49.2 4.1	27 59.2 2.6	58.9	56	17 57 18 34 19 18	20 22	21 29	22 58	24 39						
	18	91 54.6 S 0 10.9	348 12.3 4.1	S27 56.6 2.8	58.9	54	17 57 18 32 19 14	20 43	21 49	23 15	24 51						
	19	106 54.8 11.8	2 35.4 4.0	27 53.8 3.0	58.9	52	17 57 18 30 19 10	21 01	22 07	23 30	25 02						
	20	121 55.0 12.8	16 58.4 4.1	27 50.8 3.2	58.9	50	17 57 18 29 19 07	21 16	22 22	23 42	25 11						
	21	136 55.2 13.8	31 21.5 4.0	27 47.6 3.4	59.0	45	17 56 18 26 19 00	21 47	22 51	24 08	00 08						
	22	151 55.4 14.8	45 44.5 4.1	27 44.2 3.5	59.0	N 40	17 56 18 23 18 55	22 11	23 15	24 28	00 28						
	23	166 55.7 15.7	60 07.6 4.0	27 40.7 3.8	59.0	35	17 56 18 21 18 51	22 30	23 34	24 45	00 45						
	SUNDAY	00	181 55.9 S 0 16.7	74 30.6 4.0	S27 36.9 3.9	59.1	30	17 56 18 20 18 47	22 47	23 50	25 00	01 00					
01		196 56.1 17.7	88 53.6 4.1	27 33.0 4.2	59.1	20	17 56 18 18 18 43	23 16	24 18	00 18	01 24						
02		211 56.3 18.7	103 16.7 4.1	27 28.8 4.3	59.1	N 10	17 56 18 17 18 41	23 40	24 42	00 42	01 45						
03		226 56.5 19.6	117 39.8 4.0	27 24.5 4.5	59.2	0	17 56 18 16 18 40	24 03	00 03	01 04	02 05						
04		241 56.8 20.6	132 02.8 4.1	27 20.0 4.7	59.2	S 10	17 56 18 17 18 41	24 25	00 25	01 26	02 25						
05		256 57.0 21.6	146 25.9 4.1	27 15.3 4.9	59.2	20	17 56 18 18 18 44	24 50	00 50	01 49	02 45						
06		271 57.2 S 0 22.5	160 49.0 4.1	S27 10.4 5.1	59.3	30	17 57 18 21 18 48	00 15	01 18	02 17	03 09						
07		286 57.4 23.5	175 12.1 4.2	27 05.3 5.2	59.3	35	17 57 18 22 18 52	00 31	01 35	02 33	03 23						
08		301 57.6 24.5	189 35.3 4.1	27 00.1 5.5	59.3	40	17 57 18 24 18 56	00 49	01 54	02 51	03 39						
09		316 57.8 25.5	203 58.4 4.2	26 54.6 5.6	59.3	45	17 58 18 27 19 02	01 12	02 18	03 14	03 58						
10		331 58.1 26.4	218 21.6 4.2	26 49.0 5.8	59.4	S 50	17 58 18 31 19 09	01 40	02 48	03 42	04 22						
11		346 58.3 27.4	232 44.8 4.2	26 43.2 6.1	59.4	52	17 59 18 32 19 12	01 55	03 03	03 56	04 33						
12		1 58.5 S 0 28.4	247 08.0 4.3	S26 37.1 6.2	59.4	54	17 59 18 34 19 16	02 11	03 21	04 12	04 46						
13		16 58.7 29.4	261 31.3 4.3	26 30.9 6.3	59.5	56	17 59 18 37 19 21	02 30	03 42	04 31	05 01						
14		31 58.9 30.3	275 54.6 4.3	26 24.6 6.6	59.5	58	18 00 18 39 19 26	02 55	04 08	04 54	05 18						
15		46 59.2 31.3	290 17.9 4.4	26 18.0 6.8	59.5	S 60	18 00 18 42 19 32	03 27	04 46	05 24	05 39						
16		61 59.4 32.3	304 41.3 4.4	26 11.2 6.9	59.5	SUN		MOON									
17		76 59.6 33.3	319 04.7 4.4	26 04.3 7.1	59.6	Day	Eqn. of Time	Mer.	Mer. Pass.	Age	Phase						
18		91 59.8 S 0 34.2	333 28.1 4.5	S25 57.2 7.3	59.6		00 ^h 12 ^h	Pass.	Upper	Lower	d %						
19		107 00.0 35.2	347 51.6 4.5	25 49.9 7.5	59.6	d	m s	m s	h m	h m	h m	%					
20		122 00.2 36.2	2 15.1 4.5	25 42.4 7.6	59.7	22	07 01	07 11	11 53	17 48	05 19	07 47					
21		137 00.5 37.1	16 38.6 4.6	25 34.8 7.9	59.7	23	07 22	07 33	11 52	18 49	06 18	08 58					
22		152 00.7 38.1	31 02.2 4.7	25 26.9 8.0	59.7	24	07 43	07 54	11 52	19 51	07 20	09 69					
23		167 00.9 39.1	45 25.9 4.7	S25 18.9 8.2	59.7												
			SD 16.0 d 1.0	SD 15.8 16.0 16.2													

UT	ARIES		VENUS −4.7		MARS +1.7		JUPITER −2.8		SATURN +0.5		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
MONDAY	25 ^d 00 ^h	3 33.4	222 53.1	N11 18.4	166 18.8	S 6 52.5	320 42.7	N14 58.7	29 05.0	S12 29.9	Acamar	315 12.3	S40 12.3
	01	18 35.9	237 53.9	18.2	181 19.8	53.2	335 45.3	58.6	44 07.6	30.0	Achernar	335 20.4	S57 06.8
	02	33 38.4	252 54.8	18.1	196 20.7	53.8	350 47.9	58.6	59 10.2	30.0	Acrux	173 02.0	S63 13.8
	03	48 40.8	267 55.6	18.0	211 21.6	54.5	5 50.5	58.5	74 12.8	30.1	Adhara	255 06.8	S28 59.9
	04	63 43.3	282 56.4	17.9	226 22.6	55.1	20 53.2	58.4	89 15.4	30.1	Aldebaran	290 40.7	N16 33.5
	05	78 45.8	297 57.2	17.7	241 23.5	55.8	35 55.8	58.4	104 18.0	30.2			
	06	93 48.2	312 58.1	N11 17.6	256 24.4	S 6 56.4	50 58.4	N14 58.3	119 20.6	S12 30.2	Alioth	166 14.4	N55 50.0
	07	108 50.7	327 58.9	17.5	271 25.4	57.1	66 01.1	58.3	134 23.2	30.3	Alkaid	152 53.3	N49 11.9
	08	123 53.1	342 59.7	17.4	286 26.3	57.7	81 03.7	58.2	149 25.8	30.3	Alnair	27 33.9	S46 50.8
	09	138 55.6	358 00.5	17.2	301 27.2	58.4	96 06.3	58.2	164 28.4	30.4	Alnilam	275 38.8	S 1 11.0
	10	153 58.1	13 01.3	17.1	316 28.2	59.0	111 08.9	58.1	179 31.1	30.4	Alphard	217 49.1	S 8 45.5
	11	169 00.5	28 02.1	17.0	331 29.1	6 59.7	126 11.6	58.1	194 33.7	30.5			
	12	184 03.0	43 02.9	N11 16.8	346 30.0	S 7 00.3	141 14.2	N14 58.0	209 36.3	S12 30.5	Alphecca	126 04.9	N26 38.3
	13	199 05.5	58 03.8	16.7	1 30.9	01.0	156 16.8	58.0	224 38.9	30.6	Alpheratz	357 35.5	N29 13.4
	14	214 07.9	73 04.6	16.6	16 31.9	01.6	171 19.5	57.9	239 41.5	30.6	Altair	62 00.9	N 8 56.0
	15	229 10.4	88 05.4	16.4	31 32.8	02.3	186 22.1	57.8	254 44.1	30.7	Ankaa	353 07.8	S42 10.5
	16	244 12.9	103 06.2	16.3	46 33.7	02.9	201 24.7	57.8	269 46.7	30.7	Antares	112 17.3	S26 29.1
	17	259 15.3	118 07.0	16.2	61 34.7	03.6	216 27.4	57.7	284 49.3	30.8			
	18	274 17.8	133 07.8	N11 16.0	76 35.6	S 7 04.2	231 30.0	N14 57.7	299 51.9	S12 30.9	Arcturus	145 49.2	N19 03.7
	19	289 20.3	148 08.6	15.9	91 36.5	04.9	246 32.6	57.6	314 54.5	30.9	Atria	107 12.7	S69 04.4
	20	304 22.7	163 09.3	15.7	106 37.4	05.5	261 35.3	57.6	329 57.1	31.0	Avior	234 15.5	S59 34.7
	21	319 25.2	178 10.1	15.6	121 38.4	06.2	276 37.9	57.5	344 59.7	31.0	Bellatrix	278 24.0	N 6 22.4
	22	334 27.6	193 10.9	15.5	136 39.3	06.8	291 40.5	57.4	0 02.3	31.1	Betelgeuse	270 53.2	N 7 24.8
	23	349 30.1	208 11.7	15.3	151 40.2	07.5	306 43.2	57.4	15 04.9	31.1			
TUESDAY	26 ^d 00 ^h	4 32.6	223 12.5	N11 15.2	166 41.2	S 7 08.1	321 45.8	N14 57.3	30 07.5	S12 31.2	Canopus	263 52.9	S52 42.1
	01	19 35.0	238 13.3	15.0	181 42.1	08.8	336 48.4	57.3	45 10.2	31.2	Capella	280 23.4	N46 01.2
	02	34 37.5	253 14.1	14.9	196 43.0	09.4	351 51.1	57.2	60 12.8	31.3	Deneb	49 26.3	N45 22.1
	03	49 40.0	268 14.8	14.7	211 43.9	10.1	6 53.7	57.2	75 15.4	31.3	Denebola	182 26.4	N14 26.5
	04	64 42.4	283 15.6	14.6	226 44.9	10.7	21 56.4	57.1	90 18.0	31.4	Diphda	348 48.0	S17 51.3
	05	79 44.9	298 16.4	14.4	241 45.8	11.4	36 59.0	57.1	105 20.6	31.4			
	06	94 47.4	313 17.2	N11 14.3	256 46.7	S 7 12.0	52 01.6	N14 57.0	120 23.2	S12 31.5	Dubhe	193 42.9	N61 37.4
	07	109 49.8	328 17.9	14.1	271 47.7	12.7	67 04.3	56.9	135 25.8	31.5	Elnath	278 03.2	N28 37.6
	08	124 52.3	343 18.7	14.0	286 48.6	13.3	82 06.9	56.9	150 28.4	31.6	Eltanin	90 42.7	N51 29.4
	09	139 54.8	358 19.5	13.8	301 49.5	14.0	97 09.5	56.8	165 31.0	31.6	Enif	33 39.6	N 9 59.1
	10	154 57.2	13 20.2	13.7	316 50.4	14.6	112 12.2	56.8	180 33.6	31.7	Fomalhaut	15 15.4	S29 29.8
	11	169 59.7	28 21.0	13.5	331 51.4	15.2	127 14.8	56.7	195 36.2	31.7			
	12	185 02.1	43 21.8	N11 13.4	346 52.3	S 7 15.9	142 17.5	N14 56.7	210 38.8	S12 31.8	Gacrux	171 53.5	S57 14.7
	13	200 04.6	58 22.5	13.2	1 53.2	16.5	157 20.1	56.6	225 41.4	31.8	Gienah	175 45.0	S17 40.2
	14	215 07.1	73 23.3	13.1	16 54.1	17.2	172 22.7	56.5	240 44.0	31.9	Hadar	148 38.1	S60 29.3
	15	230 09.5	88 24.0	12.9	31 55.1	17.8	187 25.4	56.5	255 46.6	31.9	Hamal	327 52.1	N23 34.5
	16	245 12.0	103 24.8	12.7	46 56.0	18.5	202 28.0	56.4	270 49.2	32.0	Kaus Aust.	83 33.9	S34 22.5
	17	260 14.5	118 25.5	12.6	61 56.9	19.1	217 30.7	56.4	285 51.8	32.0			
	18	275 16.9	133 26.3	N11 12.4	76 57.8	S 7 19.8	232 33.3	N14 56.3	300 54.4	S12 32.1	Kochab	137 20.6	N74 03.7
	19	290 19.4	148 27.0	12.3	91 58.8	20.4	247 35.9	56.2	315 57.0	32.1	Markab	13 30.7	N15 20.1
	20	305 21.9	163 27.8	12.1	106 59.7	21.1	262 38.6	56.2	330 59.6	32.2	Menkar	314 07.0	N 4 11.1
	21	320 24.3	178 28.5	11.9	122 00.6	21.7	277 41.2	56.1	346 02.2	32.2	Menkent	147 59.3	S36 29.1
	22	335 26.8	193 29.3	11.8	137 01.5	22.4	292 43.9	56.1	1 04.8	32.3	Miaplacidus	221 39.2	S69 48.5
	23	350 29.2	208 30.0	11.6	152 02.5	23.0	307 46.5	56.0	16 07.4	32.3			
WEDNESDAY	27 ^d 00 ^h	5 31.7	223 30.8	N11 11.4	167 03.4	S 7 23.7	322 49.1	N14 56.0	31 10.0	S12 32.4	Mirfak	308 29.5	N49 56.6
	01	20 34.2	238 31.5	11.3	182 04.3	24.3	337 51.8	55.9	46 12.7	32.4	Nunki	75 49.0	S26 16.1
	02	35 36.6	253 32.2	11.1	197 05.2	25.0	352 54.4	55.8	61 15.3	32.5	Peacock	53 07.1	S56 39.7
	03	50 39.1	268 33.0	10.9	212 06.2	25.6	7 57.1	55.8	76 17.9	32.5	Pollux	243 18.8	N27 58.2
	04	65 41.6	283 33.7	10.8	227 07.1	26.3	22 59.7	55.7	91 20.5	32.6	Procyon	244 52.1	N 5 10.0
	05	80 44.0	298 34.4	10.6	242 08.0	26.9	38 02.4	55.7	106 23.1	32.6			
	06	95 46.5	313 35.2	N11 10.4	257 08.9	S 7 27.6	53 05.0	N14 55.6	121 25.7	S12 32.7	Rasalhague	95 59.6	N12 32.7
	07	110 49.0	328 35.9	10.2	272 09.9	28.2	68 07.7	55.5	136 28.3	32.7	Regulus	207 35.9	N11 51.2
	08	125 51.4	343 36.6	10.1	287 10.8	28.9	83 10.3	55.5	151 30.9	32.8	Rigel	281 04.8	S 8 10.2
	09	140 53.9	358 37.3	9 09.9	302 11.7	29.5	98 12.9	55.4	166 33.5	32.8	Rigel Kent.	139 42.4	S60 56.0
	10	155 56.4	13 38.1	09.7	317 12.6	30.1	113 15.6	55.4	181 36.1	32.9	Sabik	102 04.1	S15 45.2
	11	170 58.8	28 38.8	09.5	332 13.6	30.8	128 18.2	55.3	196 38.7	32.9			
	12	186 01.3	43 39.5	N11 09.3	347 14.5	S 7 31.4	143 20.9	N14 55.2	211 41.3	S12 33.0	Schedar	349 31.7	N56 40.1
	13	201 03.7	58 40.2	09.2	2 15.4	32.1	158 23.5	55.2	226 43.9	33.0	Shaula	96 11.9	S37 07.3
	14	216 06.2	73 40.9	09.0	17 16.3	32.7	173 26.2	55.1	241 46.5	33.1	Sirius	258 27.2	S16 44.6
	15	231 08.7	88 41.6	08.8	32 17.2	33.4	188 28.8	55.1	256 49.1	33.1	Spica	158 23.7	S11 17.0
	16	246 11.1	103 42.3	08.6	47 18.2	34.0	203 31.5	55.0	271 51.7	33.2	Suhail	222 47.4	S43 31.4
	17	261 13.6	118 43.0	08.4	62 19.1	34.7	218 34.1	54.9	286 54.3	33.2			
	18	276 16.1	133 43.8	N11 08.3	77 20.0	S 7 35.3	233 36.8	N14 54.9	301 56.9	S12 33.3	Vega	80 33.9	N38 48.6
	19	291 18.5	148 44.5	08.1	92 20.9	36.0	248 39.4	54.8	316 59.5	33.3	Zuben'ubi	136 57.5	S16 08.3
	20	306 21.0	163 45.2	07.9	107 21.8	36.6	263 42.1	54.8	332 02.1	33.4			
	21	321 23.5	178 45.9	07.7	122 22.8	37.3	278 44.7	54.7	347 04.7	33.4			
	22	336 25.9	193 46.6	07.5	137 23.7	37.9	293 47.4	54.6	2 07.3	33.5	Venus	218 39.9	h 9 07
	23	351 28.4	208 47.3	07.3	152 24.6	38.6	308 50.0	54.6	17 09.9	33.5	Mars	162 08.6	12 52
		h m									Jupiter	317 13.2	2 32
Mer. Pass. 23		37.9	v 0.8	d 0.2	v 0.9	d 0.6	v 2.6	d 0.1	v 2.6	d 0.1	Saturn	25 35.0	21 56

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	25		26	27	28			
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m			
MONDAY	25 00	182 01.1 S 0 40.1	59 49.6	4.7	S25 10.7	8.4	59.8	N 72	03 20	04 47	05 55		20 13	18 55	18 11			
	01	197 01.3	41.0	74 13.3	4.8	25 02.3	8.5	59.8	N 70	03 37	04 53	05 54		19 28	18 38	18 06		
	02	212 01.6	42.0	88 37.1	4.9	24 53.8	8.7	59.8	68	03 50	04 58	05 54	20 30	18 57	18 25	18 01		
	03	227 01.8	43.0	103 01.0	4.9	24 45.1	8.9	59.9	66	04 00	05 02	05 54	19 12	18 35	18 14	17 58		
	04	242 02.0	44.0	117 24.9	4.9	24 36.2	9.1	59.9	64	04 09	05 06	05 53	18 34	18 16	18 04	17 54		
	05	257 02.2	44.9	131 48.8	5.0	24 27.1	9.2	59.9	62	04 16	05 09	05 53	18 07	18 01	17 56	17 52		
	06	272 02.4 S 0 45.9	146 12.8	5.1	S24 17.9	9.4	59.9	60	04 22	05 11	05 53	17 46	17 49	17 49	17 49			
	07	287 02.6	46.9	160 36.9	5.1	24 08.5	9.6	60.0	N 58	04 27	05 13	05 53	17 29	17 38	17 43	17 47		
	08	302 02.9	47.9	175 01.0	5.2	23 58.9	9.8	60.0	56	04 31	05 15	05 52	17 14	17 28	17 37	17 45		
	09	317 03.1	48.8	189 25.2	5.3	23 49.1	9.9	60.0	54	04 35	05 17	05 52	17 01	17 19	17 33	17 43		
	10	332 03.3	49.8	203 49.5	5.3	23 39.2	10.0	60.0	52	04 39	05 18	05 52	16 50	17 12	17 28	17 42		
	11	347 03.5	50.8	218 13.8	5.4	23 29.2	10.3	60.1	50	04 42	05 20	05 52	16 40	17 05	17 24	17 40		
	12	2 03.7 S 0 51.7	232 38.2	5.4	S23 18.9	10.4	60.1	45	04 48	05 22	05 51	16 19	16 50	17 15	17 37			
	13	17 03.9	52.7	247 02.6	5.5	S23 08.5	10.5	60.1	N 40	04 52	05 24	05 51	16 02	16 37	17 07	17 34		
	14	32 04.2	53.7	261 27.1	5.6	22 58.0	10.8	60.1	35	04 56	05 25	05 51	15 47	16 27	17 01	17 32		
	15	47 04.4	54.7	275 51.7	5.6	22 47.2	10.8	60.2	30	04 59	05 26	05 50	15 35	16 17	16 55	17 30		
	16	62 04.6	55.6	290 16.3	5.8	22 36.4	11.1	60.2	20	05 02	05 28	05 50	15 13	16 01	16 45	17 26		
	17	77 04.8	56.6	304 41.1	5.7	22 25.3	11.2	60.2	N 10	05 04	05 28	05 49	14 54	15 47	16 36	17 23		
	18	92 05.0 S 0 57.6	319 05.8	5.9	S22 14.1	11.3	60.2	0	05 04	05 28	05 48	14 36	15 34	16 28	17 20			
	19	107 05.2	58.6	333 30.7	5.9	22 02.8	11.5	60.3	S 10	05 02	05 26	05 47	14 19	15 20	16 20	17 17		
	20	122 05.5	0 59.5	347 55.6	6.0	21 51.3	11.7	60.3	20	04 59	05 24	05 46	13 59	15 06	16 11	17 14		
	21	137 05.7	1 00.5	2 20.6	6.1	21 39.6	11.8	60.3	30	04 53	05 21	05 45	13 37	14 49	16 01	17 10		
	22	152 05.9	01.5	16 45.7	6.1	21 27.8	11.9	60.3	35	04 49	05 19	05 44	13 24	14 40	15 55	17 08		
	23	167 06.1	02.5	31 10.8	6.2	21 15.9	12.1	60.3	40	04 45	05 16	05 43	13 09	14 29	15 48	17 06		
	TUESDAY	00	182 06.3 S 1 03.4	45 36.0	6.3	S21 03.8	12.2	60.4	45	04 38	05 13	05 42	12 51	14 16	15 40	17 03		
01		197 06.5	04.4	60 01.3	6.3	20 51.6	12.4	60.4	S 50	04 30	05 09	05 41	12 29	14 00	15 30	17 00		
02		212 06.8	05.4	74 26.6	6.4	20 39.2	12.5	60.4	52	04 26	05 06	05 40	12 18	13 52	15 26	16 58		
03		227 07.0	06.3	88 52.0	6.5	20 26.7	12.7	60.4	54	04 22	05 04	05 40	12 06	13 44	15 21	16 56		
04		242 07.2	07.3	103 17.5	6.6	20 14.0	12.8	60.4	56	04 17	05 02	05 39	11 52	13 34	15 16	16 55		
05		257 07.4	08.3	117 43.1	6.7	20 01.2	12.9	60.5	58	04 11	04 59	05 38	11 35	13 23	15 10	16 53		
06		272 07.6 S 1 09.3	132 08.8	6.7	S19 48.3	13.1	60.5	S 60	04 05	04 55	05 37	11 15	13 11	15 03	16 50			
07		287 07.8	10.2	146 34.5	6.8	19 35.2	13.2	60.5	Lat.		Twilight		Moonset					
08		302 08.1	11.2	161 00.3	6.8	19 22.0	13.4	60.5	Sunset		Civil		Naut.		25	26	27	28
09		317 08.3	12.2	175 26.1	7.0	19 08.6	13.4	60.5							25	26	27	28
10		332 08.5	13.2	189 52.1	7.0	18 55.2	13.6	60.6							25	26	27	28
11		347 08.7	14.1	204 18.1	7.1	18 41.6	13.7	60.6	N 72	17 46	18 53	20 18		23 50	27 01	03 01		
12		2 08.9 S 1 15.1	218 44.2	7.2	S18 27.9	13.9	60.6	N 70	17 46	18 47	20 03			00 33	03 15			
13		17 09.1	16.1	233 10.4	7.2	18 14.0	13.9	60.6	68	17 47	18 42	19 50	21 29	25 01	01 01	03 26		
14		32 09.3	17.1	247 36.6	7.3	18 00.1	14.1	60.6	66	17 47	18 38	19 40	22 46	25 22	01 22	03 35		
15		47 09.6	18.0	262 02.9	7.4	17 46.0	14.2	60.6	64	17 48	18 35	19 32	23 23	25 39	01 39	03 42		
16		62 09.8	19.0	276 29.3	7.5	17 31.8	14.3	60.7	62	17 48	18 32	19 25	23 49	25 52	01 52	03 48		
17		77 10.0	20.0	290 55.8	7.5	17 17.5	14.5	60.7	60	17 49	18 30	19 19	24 09	00 09	02 04	03 54		
18		92 10.2 S 1 20.9	305 22.3	7.6	S17 03.0	14.5	60.7	N 58	17 49	18 28	19 14	24 25	00 25	02 14	03 59			
19		107 10.4	21.9	319 48.9	7.7	16 48.5	14.7	60.7	56	17 49	18 26	19 10	24 39	00 39	02 22	04 03		
20		122 10.6	22.9	334 15.6	7.7	16 33.8	14.8	60.7	54	17 50	18 25	19 06	24 51	00 51	02 30	04 07		
21		137 10.9	23.9	348 42.3	7.9	16 19.0	14.8	60.7	52	17 50	18 23	19 03	25 02	01 02	02 37	04 10		
22		152 11.1	24.8	3 09.2	7.9	16 04.2	15.0	60.7	50	17 50	18 22	19 00	25 11	01 11	02 43	04 13		
23		167 11.3	25.8	17 36.1	7.9	15 49.2	15.1	60.8	45	17 51	18 20	18 54	00 08	01 31	02 56	04 20		
WEDNESDAY		00	182 11.5 S 1 26.8	32 03.0	8.1	S15 34.1	15.2	60.8	N 40	17 51	18 18	18 50	00 28	01 47	03 07	04 25		
	01	197 11.7	27.8	46 30.1	8.1	15 18.9	15.3	60.8	35	17 52	18 17	18 46	00 45	02 00	03 16	04 30		
	02	212 11.9	28.7	60 57.2	8.2	15 03.6	15.4	60.8	30	17 52	18 16	18 44	01 00	02 12	03 24	04 34		
	03	227 12.1	29.7	75 24.4	8.2	14 48.2	15.5	60.8	20	17 53	18 15	18 40	01 24	02 31	03 37	04 41		
	04	242 12.4	30.7	89 51.6	8.3	14 32.7	15.5	60.8	N 10	17 54	18 15	18 39	01 45	02 48	03 49	04 47		
	05	257 12.6	31.6	104 18.9	8.4	14 17.2	15.7	60.8	0	17 55	18 15	18 39	02 05	03 04	04 00	04 53		
	06	272 12.8 S 1 32.6	118 46.3	8.5	S14 01.5	15.8	60.8	S 10	17 56	18 17	18 41	02 25	03 20	04 11	04 58			
	07	287 13.0	33.6	133 13.8	8.5	13 45.7	15.8	60.8	20	17 57	18 19	18 44	02 45	03 36	04 22	05 04		
	08	302 13.2	34.6	147 41.3	8.6	13 29.9	15.9	60.9	30	17 58	18 22	18 50	03 09	03 55	04 35	05 11		
	09	317 13.4	35.5	162 08.9	8.6	13 14.0	16.0	60.9	35	17 59	18 24	18 54	03 23	04 06	04 43	05 15		
	10	332 13.6	36.5	176 36.5	8.8	12 58.0	16.1	60.9	40	18 00	18 27	18 59	03 39	04 18	04 51	05 19		
	11	347 13.9	37.5	191 04.3	8.7	12 41.9	16.2	60.9	45	18 01	18 31	19 05	03 58	04 33	05 01	05 24		
	12	2 14.1 S 1 38.5	205 32.0	8.9	S12 25.7	16.3	60.9	S 50	18 03	18 35	19 14	04 22	04 51	05 12	05 30			
	13	17 14.3	39.4	219 59.9	8.9	12 09.4	16.3	60.9	52	18 04	18 38	19 18	04 33	04 59	05 18	05 33		
	14	32 14.5	40.4	234 27.8	9.0	11 53.1	16.4	60.9	54	18 04	18 40	19 22	04 46	05 08	05 24	05 36		
	15	47 14.7	41.4	248 55.8	9.0	11 36.7	16.5	60.9	56	18 05	18 43	19 27	05 01	05 19	05 30	05 39		
	16	62 14.9	42.3	263 23.8	9.1	11 20.2	16.5	60.9	58	18 06	18 46	19 33	05 18	05 30	05 38	05 42		
	17	77 15.1	43.3	277 51.9	9.1	11 03.7	16.6	60.9	S 60	18 07	18 49	19 40	05 39	05 44	05 46	05 46		
	18	92 15.3 S 1 44.3	292 20.0	9.2	S10 47.1	16.7	60.9	SUN		MOON								
	19	107 15.6	45.3	306 48.2	9.3	10 30.4	16.8	60.9	Day	Eqn. of Time	Mer.	Mer. Pass.		Age	Phase			
	20	122 15.8	46.2	321 16.5	9.3	10 13.6	16.8	60.9				Pass.	Upper			Lower		
	21	137 16.0	47.2	335 44.8	9.4													

UT	ARIES		VENUS -4.7		MARS +1.6		JUPITER -2.8		SATURN +0.5		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
28 T H U R S D A Y	00	6 30.9	223 48.0	N11 07.1	167 25.5	S 7 39.2	323 52.7	N14 54.5	32 12.5	S12 33.6	Acamar	315 12.3	S40 12.3
	01	21 33.3	238 48.6	06.9	182 26.5	39.8	338 55.3	54.5	47 15.1	33.6	Achernar	335 20.4	S57 06.8
	02	36 35.8	253 49.3	06.7	197 27.4	40.5	353 58.0	54.4	62 17.7	33.7	Acruhs	173 02.0	S63 13.7
	03	51 38.2	268 50.0	06.6	212 28.3	41.1	9 00.6	54.3	77 20.3	33.7	Adhara	255 06.8	S28 59.9
	04	66 40.7	283 50.7	06.4	227 29.2	41.8	24 03.3	54.3	92 22.9	33.8	Aldebaran	290 40.7	N16 33.5
	05	81 43.2	298 51.4	06.2	242 30.1	42.4	39 05.9	54.2	107 25.5	33.8			
	06	96 45.6	313 52.1	N11 06.0	257 31.1	S 7 43.1	54 08.6	N14 54.2	122 28.1	S12 33.9	Alioth	166 14.4	N55 50.0
	07	111 48.1	328 52.8	05.8	272 32.0	43.7	69 11.2	54.1	137 30.7	33.9	Alkaid	152 53.3	N49 11.9
	08	126 50.6	343 53.5	05.6	287 32.9	44.4	84 13.9	54.0	152 33.3	34.0	Alnair	27 33.9	S46 50.9
	09	141 53.0	358 54.1	05.4	302 33.8	45.0	99 16.5	54.0	167 35.9	34.0	Alnilam	275 38.8	S 1 11.0
	10	156 55.5	13 54.8	05.2	317 34.7	45.7	114 19.2	53.9	182 38.5	34.1	Alphard	217 49.0	S 8 45.5
	11	171 58.0	28 55.5	05.0	332 35.7	46.3	129 21.8	53.9	197 41.1	34.1			
	12	187 00.4	43 56.2	N11 04.8	347 36.6	S 7 46.9	144 24.5	N14 53.8	212 43.7	S12 34.2	Alphecca	126 04.9	N26 38.3
	13	202 02.9	58 56.8	04.6	2 37.5	47.6	159 27.1	53.7	227 46.3	34.2	Alpheratz	357 35.5	N29 13.4
	14	217 05.3	73 57.5	04.4	17 38.4	48.2	174 29.8	53.7	242 48.9	34.3	Altair	62 00.9	N 8 56.0
	15	232 07.8	88 58.2	04.2	32 39.3	48.9	189 32.4	53.6	257 51.5	34.3	Ankaa	353 07.8	S42 10.6
	16	247 10.3	103 58.8	04.0	47 40.2	49.5	204 35.1	53.5	272 54.1	34.4	Antares	112 17.3	S26 29.1
	17	262 12.7	118 59.5	03.8	62 41.2	50.2	219 37.8	53.5	287 56.7	34.4			
	18	277 15.2	134 00.2	N11 03.5	77 42.1	S 7 50.8	234 40.4	N14 53.4	302 59.3	S12 34.5	Arcturus	145 49.2	N19 03.7
	19	292 17.7	149 00.8	03.3	92 43.0	51.5	249 43.1	53.4	318 01.9	34.5	Atria	107 12.7	S69 04.4
	20	307 20.1	164 01.5	03.1	107 43.9	52.1	264 45.7	53.3	333 04.5	34.6	Avior	234 15.5	S59 34.7
	21	322 22.6	179 02.2	02.9	122 44.8	52.8	279 48.4	53.2	348 07.1	34.6	Bellatrix	278 24.0	N 6 22.4
	22	337 25.1	194 02.8	02.7	137 45.8	53.4	294 51.0	53.2	3 09.7	34.7	Betelgeuse	270 53.2	N 7 24.8
	23	352 27.5	209 03.5	02.5	152 46.7	54.0	309 53.7	53.1	18 12.3	34.7			
29	00	7 30.0	224 04.1	N11 02.3	167 47.6	S 7 54.7	324 56.3	N14 53.0	33 14.9	S12 34.7	Canopus	263 52.9	S52 42.1
	01	22 32.5	239 04.8	02.1	182 48.5	55.3	339 59.0	53.0	48 17.5	34.8	Capella	280 23.3	N46 01.2
	02	37 34.9	254 05.4	01.9	197 49.4	56.0	355 01.7	52.9	63 20.1	34.8	Deneb	49 26.3	N45 22.1
	03	52 37.4	269 06.1	01.6	212 50.3	56.6	10 04.3	52.9	78 22.7	34.9	Denebola	182 26.4	N14 26.5
	04	67 39.8	284 06.7	01.4	227 51.3	57.3	25 07.0	52.8	93 25.3	34.9	Diphda	348 48.0	S17 51.3
	05	82 42.3	299 07.4	01.2	242 52.2	57.9	40 09.6	52.7	108 27.9	35.0			
	06	97 44.8	314 08.0	N11 01.0	257 53.1	S 7 58.6	55 12.3	N14 52.7	123 30.4	S12 35.0	Dubhe	193 42.9	N61 37.4
	07	112 47.2	329 08.7	00.8	272 54.0	59.2	70 15.0	52.6	138 33.0	35.1	Elnath	278 03.1	N28 37.6
	08	127 49.7	344 09.3	00.5	287 54.9	7 59.8	85 17.6	52.5	153 35.6	35.1	Eltanin	90 42.8	N51 29.4
	09	142 52.2	359 09.9	00.3	302 55.8	8 00.5	100 20.3	52.5	168 38.2	35.2	Enif	33 39.6	N 9 59.1
	10	157 54.6	14 10.6	11 00.1	317 56.8	01.1	115 22.9	52.4	183 40.8	35.2	Fomalhaut	15 15.4	S29 29.8
	11	172 57.1	29 11.2	10 59.9	332 57.7	01.8	130 25.6	52.4	198 43.4	35.3			
	12	187 59.6	44 11.8	N10 59.6	347 58.6	S 8 02.4	145 28.3	N14 52.3	213 46.0	S12 35.3	Gacrux	171 53.5	S57 14.6
	13	203 02.0	59 12.5	59.4	2 59.5	03.1	160 30.9	52.2	228 48.6	35.4	Gienah	175 45.0	S17 40.2
	14	218 04.5	74 13.1	59.2	18 00.4	03.7	175 33.6	52.2	243 51.2	35.4	Hadar	148 38.2	S60 29.3
	15	233 06.9	89 13.7	59.0	33 01.3	04.3	190 36.2	52.1	258 53.8	35.5	Hamal	327 52.1	N23 34.5
	16	248 09.4	104 14.4	58.7	48 02.2	05.0	205 38.9	52.0	273 56.4	35.5	Kaus Aust.	83 33.9	S34 22.5
	17	263 11.9	119 15.0	58.5	63 03.2	05.6	220 41.6	52.0	288 59.0	35.6			
	18	278 14.3	134 15.6	N10 58.3	78 04.1	S 8 06.3	235 44.2	N14 51.9	304 01.6	S12 35.6	Kochab	137 20.6	N74 03.7
	19	293 16.8	149 16.2	58.0	93 05.0	06.9	250 46.9	51.8	319 04.2	35.7	Markab	13 30.7	N15 20.1
	20	308 19.3	164 16.8	57.8	108 05.9	07.6	265 49.6	51.8	334 06.8	35.7	Menkar	314 07.0	N 4 11.1
	21	323 21.7	179 17.5	57.6	123 06.8	08.2	280 52.2	51.7	349 09.4	35.7	Menkent	147 59.3	S36 29.1
	22	338 24.2	194 18.1	57.3	138 07.7	08.8	295 54.9	51.6	4 12.0	35.8	Miaplacidus	221 39.2	S69 48.5
	23	353 26.7	209 18.7	57.1	153 08.6	09.5	310 57.5	51.6	19 14.6	35.8			
30	00	8 29.1	224 19.3	N10 56.9	168 09.6	S 8 10.1	326 00.2	N14 51.5	34 17.2	S12 35.9	Mirfak	308 29.5	N49 56.6
	01	23 31.6	239 19.9	56.6	183 10.5	10.8	341 02.9	51.5	49 19.8	35.9	Nunki	75 49.0	S26 16.1
	02	38 34.1	254 20.5	56.4	198 11.4	11.4	356 05.5	51.4	64 22.4	36.0	Peacock	53 07.1	S56 39.7
	03	53 36.5	269 21.1	56.2	213 12.3	12.1	11 08.2	51.3	79 25.0	36.0	Pollux	243 18.7	N27 58.1
	04	68 39.0	284 21.7	55.9	228 13.2	12.7	26 10.9	51.3	94 27.6	36.1	Procyon	244 52.1	N 5 10.0
	05	83 41.4	299 22.4	55.7	243 14.1	13.3	41 13.5	51.2	109 30.2	36.1			
	06	98 43.9	314 23.0	N10 55.4	258 15.0	S 8 14.0	56 16.2	N14 51.1	124 32.7	S12 36.2	Rasalhague	95 59.6	N12 32.7
	07	113 46.4	329 23.6	55.2	273 15.9	14.6	71 18.9	51.1	139 35.3	36.2	Regulus	207 35.8	N11 51.2
	08	128 48.8	344 24.2	54.9	288 16.9	15.3	86 21.5	51.0	154 37.9	36.3	Rigel	281 04.8	S 8 10.2
	09	143 51.3	359 24.8	54.7	303 17.8	15.9	101 24.2	50.9	169 40.5	36.3	Rigil Kent.	139 42.4	S60 56.0
	10	158 53.8	14 25.4	54.5	318 18.7	16.6	116 26.9	50.9	184 43.1	36.4	Sabik	102 04.1	S15 45.2
	11	173 56.2	29 26.0	54.2	333 19.6	17.2	131 29.5	50.8	199 45.7	36.4			
	12	188 58.7	44 26.5	N10 54.0	348 20.5	S 8 17.8	146 32.2	N14 50.7	214 48.3	S12 36.4	Schedar	349 31.7	N56 40.1
	13	204 01.2	59 27.1	53.7	3 21.4	18.5	161 34.9	50.7	229 50.9	36.5	Shaula	96 11.9	S37 07.3
	14	219 03.6	74 27.7	53.5	18 22.3	19.1	176 37.5	50.6	244 53.5	36.5	Sirius	258 27.2	S16 44.6
	15	234 06.1	89 28.3	53.2	33 23.2	19.8	191 40.2	50.5	259 56.1	36.6	Spica	158 23.8	S11 17.0
	16	249 08.5	104 28.9	53.0	48 24.1	20.4	206 42.9	50.5	274 58.7	36.6	Suhail	222 47.4	S43 31.4
	17	264 11.0	119 29.5	52.7	63 25.1	21.0	221 45.5	50.4	290 01.3	36.7			
	18	279 13.5	134 30.1	N10 52.5	78 26.0	S 8 21.7	236 48.2	N14 50.3	305 03.9	S12 36.7	Vega	80 33.9	N38 48.6
	19	294 15.9	149 30.7	52.2	93 26.9	22.3	251 50.9	50.3	320 06.5	36.8	Zuben'ubi	136 57.5	S16 08.3
	20	309 18.4	164 31.2	51.9	108 27.8	23.0	266 53.5	50.2	335 09.1	36.8			
	21	324 20.9	179 31.8	51.7	123 28.7	23.6	281 56.2	50.1	350 11.6	36.9			
	22	339 23.3	194 32.4	51.4	138 29.6	24.3	296 58.9	50.1	5 14.2	36.9	Venus	216 34.1	9 03
	23	354 25.8	209 33.0	51.2	153 30.5	24.9	312 01.6	50.0	20 16.8	36.9	Mars	160 17.6	12 48
										Jupiter	317 26.4	2 20	
										Saturn	25 44.9	21 43	
Mer. Pass. 23 26.2		v 0.6 d 0.2		v 0.9 d 0.6		v 2.7 d 0.1		v 2.6 d 0.0					

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	28		29	30	1		
d h	° /	° /	° /	° /	° /	° /	° /	N	°	h m	h m	h m	h m	h m	h m	h m	h m
T H U R S D A Y	28 00	182 16.6	S 1 50.1	19 10.0	9.6	S 9 06.1	17.1 60.9	N 72	03 37	05 01	06 08	18 11	17 33	16 52	15 51		
	01	197 16.8	51.1	33 38.6	9.6	8 49.0	17.1 60.9	68	04 02	05 09	06 05	18 01	17 40	17 18	16 49		
	02	212 17.0	52.1	48 07.2	9.6	8 31.9	17.1 60.9	66	04 11	05 12	06 03	17 58	17 43	17 27	17 09		
	03	227 17.3	53.0	62 35.8	9.7	8 14.8	17.2 60.9	64	04 18	05 15	06 02	17 54	17 45	17 35	17 25		
	04	242 17.5	54.0	77 04.5	9.7	7 57.6	17.2 60.9	62	04 24	05 17	06 01	17 52	17 47	17 42	17 38		
	05	257 17.7	55.0	91 33.2	9.8	7 40.4	17.3 60.9	60	04 29	05 18	06 00	17 49	17 49	17 49	17 49		
	06	272 17.9	S 1 56.0	106 02.0	9.8	S 7 23.1	17.3 60.9	N 58	04 34	05 20	05 59	17 47	17 50	17 54	17 59		
	07	287 18.1	56.9	120 30.8	9.8	7 05.8	17.3 60.9	56	04 38	05 21	05 58	17 45	17 52	17 59	18 07		
	08	302 18.3	57.9	134 59.6	9.9	6 48.5	17.4 60.9	54	04 41	05 22	05 58	17 43	17 53	18 03	18 15		
	09	317 18.5	58.9	149 28.5	10.0	6 31.1	17.4 60.9	52	04 44	05 23	05 57	17 42	17 54	18 07	18 27		
	10	332 18.7	1 59.8	163 57.5	10.0	6 13.7	17.5 60.9	50	04 46	05 24	05 56	17 40	17 55	18 11	18 28		
	11	347 18.9	2 00.8	178 26.5	10.0	5 56.2	17.5 60.9	45	04 52	05 26	05 55	17 37	17 58	18 19	18 42		
	12	2 19.2	S 2 01.8	192 55.5	10.1	S 5 38.7	17.5 60.9	N 40	04 55	05 27	05 54	17 34	18 00	18 25	18 53		
	13	17 19.4	02.8	207 24.6	10.1	5 21.2	17.5 60.9	35	04 58	05 28	05 53	17 32	18 01	18 31	19 03		
	14	32 19.6	03.7	221 53.7	10.1	5 03.7	17.6 60.9	30	05 00	05 28	05 52	17 30	18 03	18 36	19 12		
	15	47 19.8	04.7	236 22.8	10.2	4 46.1	17.6 60.9	20	05 03	05 28	05 50	17 26	18 06	18 45	19 26		
	16	62 20.0	05.7	250 52.0	10.2	4 28.5	17.6 60.9	N 10	05 03	05 28	05 49	17 23	18 08	18 53	19 39		
	17	77 20.2	06.7	265 21.2	10.2	4 10.9	17.6 60.9	0	05 02	05 26	05 47	17 20	18 10	19 01	19 52		
	18	92 20.4	S 2 07.6	279 50.4	10.3	S 3 53.3	17.7 60.9	S 10	05 00	05 24	05 45	17 17	18 13	19 08	20 04		
	19	107 20.6	08.6	294 19.7	10.3	3 35.6	17.6 60.8	20	04 56	05 22	05 44	17 14	18 15	19 16	20 18		
	20	122 20.8	09.6	308 49.0	10.4	3 18.0	17.7 60.8	30	04 49	05 17	05 41	17 10	18 18	19 26	20 33		
	21	137 21.1	10.5	323 18.4	10.3	3 00.3	17.7 60.8	35	04 45	05 15	05 40	17 08	18 20	19 31	20 42		
	22	152 21.3	11.5	337 47.7	10.4	2 42.6	17.7 60.8	40	04 39	05 11	05 38	17 06	18 22	19 38	20 53		
23	167 21.5	12.5	352 17.1	10.4	2 24.9	17.7 60.8	45	04 32	05 07	05 36	17 03	18 24	19 45	21 05			
F R I D A Y	29 00	182 21.7	S 2 13.5	6 46.5	10.5	S 2 07.2	17.7 60.8	S 50	04 23	05 02	05 34	17 00	18 27	19 54	21 20		
	01	197 21.9	14.4	21 16.0	10.4	1 49.5	17.7 60.8	52	04 19	04 59	05 33	16 58	18 28	19 58	21 27		
	02	212 22.1	15.4	35 45.4	10.5	1 31.8	17.8 60.8	54	04 14	04 57	05 32	16 56	18 30	20 02	21 35		
	03	227 22.3	16.4	50 14.9	10.5	1 14.0	17.7 60.8	56	04 08	04 53	05 31	16 55	18 31	20 08	21 44		
	04	242 22.5	17.3	64 44.4	10.6	0 56.3	17.7 60.7	58	04 02	04 50	05 29	16 53	18 33	20 13	21 54		
	05	257 22.7	18.3	79 14.0	10.5	0 38.6	17.7 60.7	S 60	03 54	04 46	05 28	16 50	18 35	20 20	22 05		
	06	272 22.9	S 2 19.3	93 43.5	10.6	S 0 20.9	17.7 60.7		Lat.	Sunset	Twilight		Moonset				
	07	287 23.2	20.3	108 13.1	10.6	S 0 03.2	17.7 60.7				Civil	Naut.	28	29	30	1	
	08	302 23.4	21.2	122 42.7	10.6	N 0 14.5	17.7 60.7										
	09	317 23.6	22.2	137 12.3	10.6	0 32.2	17.6 60.7										
	10	332 23.8	23.2	151 41.9	10.6	0 49.8	17.7 60.6										
	11	347 24.0	24.1	166 11.5	10.7	1 07.5	17.6 60.6	N 72	17 30	18 37	20 00	03 01	05 36	08 08	10 58		
	12	2 24.2	S 2 25.1	180 41.2	10.6	N 1 25.1	17.7 60.6	N 70	17 32	18 33	19 47	03 15	05 37	07 57	10 26		
	13	17 24.4	26.1	195 10.8	10.7	1 42.8	17.6 60.6	68	17 34	18 30	19 36	03 26	05 38	07 48	10 03		
	14	32 24.6	27.1	209 40.5	10.6	2 00.4	17.5 60.6	66	17 36	18 27	19 28	03 35	05 39	07 40	09 45		
	15	47 24.8	28.0	224 10.1	10.7	2 17.9	17.6 60.6	64	17 37	18 24	19 21	03 42	05 39	07 34	09 31		
	16	62 25.0	29.0	238 39.8	10.7	2 35.5	17.5 60.5	62	17 39	18 23	19 15	03 48	05 40	07 29	09 19		
	17	77 25.2	30.0	253 09.5	10.7	2 53.0	17.5 60.5	60	17 40	18 21	19 10	03 54	05 40	07 24	09 09		
	18	92 25.5	S 2 30.9	267 39.2	10.7	N 3 10.5	17.5 60.5	N 58	17 41	18 19	19 05	03 59	05 40	07 20	09 01		
	19	107 25.7	31.9	282 08.9	10.7	3 28.0	17.5 60.5	56	17 41	18 18	19 02	04 03	05 41	07 17	08 53		
	20	122 25.9	32.9	296 38.6	10.7	3 45.5	17.4 60.5	54	17 42	18 17	18 58	04 07	05 41	07 14	08 46		
	21	137 26.1	33.9	311 08.3	10.7	4 02.9	17.3 60.4	52	17 43	18 16	18 56	04 10	05 41	07 11	08 40		
	22	152 26.3	34.8	325 38.0	10.7	4 20.2	17.4 60.4	50	17 44	18 16	18 53	04 13	05 41	07 08	08 35		
23	167 26.5	35.8	340 07.7	10.6	4 37.6	17.3 60.4	45	17 45	18 14	18 48	04 20	05 42	07 03	08 23			
S A T U R D A Y	30 00	182 26.7	S 2 36.8	354 37.3	10.7	N 4 54.9	17.2 60.4	N 40	17 46	18 13	18 45	04 25	05 42	06 58	08 13		
	01	197 26.9	37.7	9 07.0	10.7	5 12.1	17.3 60.3	35	17 47	18 13	18 42	04 30	05 42	06 54	08 05		
	02	212 27.1	38.7	23 36.7	10.7	5 29.4	17.1 60.3	30	17 48	18 12	18 40	04 34	05 43	06 51	07 58		
	03	227 27.3	39.7	38 06.4	10.7	5 46.5	17.2 60.3	20	17 50	18 12	18 38	04 41	05 43	06 44	07 46		
	04	242 27.5	40.6	52 36.1	10.7	6 03.7	17.1 60.3	N 10	17 52	18 13	18 37	04 47	05 44	06 39	07 35		
	05	257 27.7	41.6	67 05.8	10.6	6 20.8	17.0 60.2	0	17 54	18 14	18 38	04 53	05 44	06 34	07 25		
	06	272 27.9	S 2 42.6	81 35.4	10.7	N 6 37.8	17.0 60.2	S 10	17 55	18 16	18 41	04 58	05 44	06 29	07 15		
	07	287 28.1	43.6	96 05.1	10.6	6 54.8	16.9 60.2	20	17 58	18 20	18 45	05 04	05 44	06 24	07 04		
	08	302 28.4	44.5	110 34.7	10.7	7 11.7	16.9 60.2	30	18 00	18 24	18 52	05 11	05 45	06 18	06 52		
	09	317 28.6	45.5	125 04.4	10.6	7 28.6	16.8 60.1	35	18 01	18 27	18 57	05 15	05 45	06 14	06 45		
	10	332 28.8	46.5	139 34.0	10.6	7 45.4	16.8 60.1	40	18 03	18 30	19 02	05 19	05 45	06 11	06 37		
	11	347 29.0	47.4	154 03.6	10.6	8 02.2	16.7 60.1	45	18 05	18 35	19 09	05 24	05 45	06 06	06 28		
	12	2 29.2	S 2 48.4	168 33.2	10.6	N 8 18.9	16.6 60.1	S 50	18 08	18 40	19 19	05 30	05 46	06 01	06 17		
	13	17 29.4	49.4	183 02.8	10.5	8 35.5	16.6 60.0	52	18 09	18 43	19 23	05 33	05 46	05 58	06 12		
	14	32 29.6	50.4	197 32.3	10.6	8 52.1	16.5 60.0	54	18 10	18 46	19 28	05 36	05 46	05 56	06 07		
	15	47 29.8	51.3	212 01.9	10.5	9 08.6	16.5 60.0	56	18 11	18 49	19 34	05 39	05 46	05 53	06 00		
	16	62 30.0	52.3	226 31.4	10.5	9 25.1	16.4 60.0	58	18 13	18 53	19 41	05 42	05 46	05 49	05 54		
	17	77 30.2	53.3	241 00.9	10.5	9 41.5	16.3 59.9	S 60	18 14	18 57	19 48	05 46	05 46	05 46	05 46		
	18	92 30.4	S 2 54.2	255 30.4	10.5	N 9 57.8	16.2 59.9										
	19	107 30.6	55.2	269 59.9	10.4	10 14.0	16.2 59.9										
	20	122 30.8	56.2	284 29.3	10.4	10 30.2	16.1 59.8										
	21	137 31.0	57.1	298 58.7	10.4	10 46.3	16.0 59.8										
	22	152 31.2	58.1	313 28.1	10.4	11 02.3	16.0 59.8										
23	167 31.4	59.1	327 57.5	10.4	N11 18.3	15.8 59.7											
	SD	16.0	d 1.0	SD	16.6	16.5	16.4										

UT	ARIES		VENUS -4.7		MARS +1.6		JUPITER -2.8		SATURN +0.5		STARS			
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
SUNDAY	100	9 28.3	224 33.6	N10 50.9	168 31.4	S 8 25.5	327 04.2	N14 49.9	35 19.4	S12 37.0	Acamar	315 12.2	S40 12.3	
	01	24 30.7	239 34.1	50.7	183 32.3	26.2	342 06.9	49.9	50 22.0	37.0	Achernar	335 20.4	S57 06.9	
	02	39 33.2	254 34.7	50.4	198 33.2	26.8	357 09.6	49.8	65 24.6	37.1	Acrux	173 02.0	S63 13.7	
	03	54 35.7	269 35.3	50.1	213 34.1	27.5	12 12.2	49.7	80 27.2	37.1	Adhara	255 06.7	S28 59.9	
	04	69 38.1	284 35.8	49.9	228 35.1	28.1	27 14.9	49.7	95 29.8	37.2	Aldebaran	290 40.7	N16 33.5	
	05	84 40.6	299 36.4	49.6	243 36.0	28.7	42 17.6	49.6	110 32.4	37.2				
	06	99 43.0	314 37.0	N10 49.3	258 36.9	S 8 29.4	57 20.3	N14 49.5	125 35.0	S12 37.3	Alioth	166 14.4	N55 50.0	
	07	114 45.5	329 37.5	49.1	273 37.8	30.0	72 22.9	49.5	140 37.6	37.3	Alkaid	152 53.3	N49 11.9	
	08	129 48.0	344 38.1	48.8	288 38.7	30.7	87 25.6	49.4	155 40.2	37.4	Alnair	27 33.9	S46 50.9	
	09	144 50.4	359 38.7	48.5	303 39.6	31.3	102 28.3	49.3	170 42.7	37.4	Alnilam	275 38.7	S 1 11.0	
	10	159 52.9	14 39.2	48.3	318 40.5	31.9	117 31.0	49.3	185 45.3	37.4	Alphard	217 49.0	S 8 45.5	
	11	174 55.4	29 39.8	48.0	333 41.4	32.6	132 33.6	49.2	200 47.9	37.5				
	12	189 57.8	44 40.3	N10 47.7	348 42.3	S 8 33.2	147 36.3	N14 49.1	215 50.5	S12 37.5	Alphecca	126 04.9	N26 38.3	
	13	205 00.3	59 40.9	47.5	3 43.2	33.9	162 39.0	49.1	230 53.1	37.6	Alpheratz	357 35.5	N29 13.4	
	14	220 02.8	74 41.5	47.2	18 44.1	34.5	177 41.7	49.0	245 55.7	37.6	Altair	62 00.9	N 8 56.0	
	15	235 05.2	89 42.0	46.9	33 45.0	35.1	192 44.3	48.9	260 58.3	37.7	Ankaa	353 07.8	S42 10.6	
	16	250 07.7	104 42.6	46.6	48 46.0	35.8	207 47.0	48.9	276 00.9	37.7	Antares	112 17.3	S26 29.1	
	17	265 10.2	119 43.1	46.4	63 46.9	36.4	222 49.7	48.8	291 03.5	37.8				
	18	280 12.6	134 43.7	N10 46.1	78 47.8	S 8 37.1	237 52.4	N14 48.7	306 06.1	S12 37.8	Arcturus	145 49.2	N19 03.7	
	19	295 15.1	149 44.2	45.8	93 48.7	37.7	252 55.0	48.7	321 08.7	37.9	Atria	107 12.8	S69 04.4	
	20	310 17.5	164 44.7	45.5	108 49.6	38.3	267 57.7	48.6	336 11.2	37.9	Avior	234 15.5	S59 34.7	
	21	325 20.0	179 45.3	45.2	123 50.5	39.0	283 00.4	48.5	351 13.8	37.9	Bellatrix	278 23.9	N 6 22.4	
	22	340 22.5	194 45.8	45.0	138 51.4	39.6	298 03.1	48.5	6 16.4	38.0	Beteigeuse	270 53.2	N 7 24.8	
	23	355 24.9	209 46.4	44.7	153 52.3	40.3	313 05.7	48.4	21 19.0	38.0				
MONDAY	200	10 27.4	224 46.9	N10 44.4	168 53.2	S 8 40.9	328 08.4	N14 48.3	36 21.6	S12 38.1	Canopus	263 52.8	S52 42.1	
	01	25 29.9	239 47.4	44.1	183 54.1	41.5	343 11.1	48.2	51 24.2	38.1	Capella	280 23.3	N46 01.2	
	02	40 32.3	254 48.0	43.8	198 55.0	42.2	358 13.8	48.2	66 26.8	38.2	Deneb	49 26.3	N45 22.1	
	03	55 34.8	269 48.5	43.5	213 55.9	42.8	13 16.5	48.1	81 29.4	38.2	Denebola	182 26.4	N14 26.5	
	04	70 37.3	284 49.0	43.3	228 56.8	43.5	28 19.1	48.0	96 32.0	38.3	Diphda	348 48.0	S17 51.3	
	05	85 39.7	299 49.6	43.0	243 57.7	44.1	43 21.8	48.0	111 34.5	38.3				
	06	100 42.2	314 50.1	N10 42.7	258 58.6	S 8 44.7	58 24.5	N14 47.9	126 37.1	S12 38.3	Dubhe	193 42.9	N61 37.4	
	07	115 44.6	329 50.6	42.4	273 59.5	45.4	73 27.2	47.8	141 39.7	38.4	Elnath	278 03.1	N28 37.6	
	08	130 47.1	344 51.2	42.1	289 00.4	46.0	88 29.9	47.8	156 42.3	38.4	Eltanin	90 42.8	N51 29.4	
	09	145 49.6	359 51.7	41.8	304 01.3	46.7	103 32.5	47.7	171 44.9	38.5	Enif	33 39.6	N 9 59.1	
	10	160 52.0	14 52.2	41.5	319 02.2	47.3	118 35.2	47.6	186 47.5	38.5	Fomalhaut	15 15.4	S29 29.8	
	11	175 54.5	29 52.7	41.2	334 03.1	47.9	133 37.9	47.6	201 50.1	38.6				
	12	190 57.0	44 53.3	N10 40.9	349 04.0	S 8 48.6	148 40.6	N14 47.5	216 52.7	S12 38.6	Gacrux	171 53.5	S57 14.6	
	13	205 59.4	59 53.8	40.6	4 05.0	49.2	163 43.3	47.4	231 55.2	38.6	Gienah	175 45.0	S17 40.2	
	14	221 01.9	74 54.3	40.3	19 05.9	49.8	178 45.9	47.3	246 57.8	38.7	Hadar	148 38.2	S60 29.2	
	15	236 04.4	89 54.8	40.1	34 06.8	50.5	193 48.6	47.3	262 00.4	38.7	Hamal	327 52.1	N23 34.5	
	16	251 06.8	104 55.3	39.8	49 07.7	51.1	208 51.3	47.2	277 03.0	38.8	Kaus Aust.	83 34.0	S34 22.5	
	17	266 09.3	119 55.8	39.5	64 08.6	51.8	223 54.0	47.1	292 05.6	38.8				
	18	281 11.8	134 56.4	N10 39.2	79 09.5	S 8 52.4	238 56.7	N14 47.1	307 08.2	S12 38.9	Kochab	137 20.7	N74 03.6	
	19	296 14.2	149 56.9	38.9	94 10.4	53.0	253 59.4	47.0	322 10.8	38.9	Markab	13 30.7	N15 20.1	
	20	311 16.7	164 57.4	38.6	109 11.3	53.7	269 02.0	46.9	337 13.4	39.0	Menkar	314 07.0	N 4 11.1	
	21	326 19.1	179 57.9	38.3	124 12.2	54.3	284 04.7	46.9	352 15.9	39.0	Menkent	147 59.3	S36 29.1	
	22	341 21.6	194 58.4	37.9	139 13.1	54.9	299 07.4	46.8	7 18.5	39.0	Miaplacidus	221 39.1	S69 48.5	
	23	356 24.1	209 58.9	37.6	154 14.0	55.6	314 10.1	46.7	22 21.1	39.1				
TUESDAY	300	11 26.5	224 59.4	N10 37.3	169 14.9	S 8 56.2	329 12.8	N14 46.6	37 23.7	S12 39.1	Mirfak	308 29.4	N49 56.6	
	01	26 29.0	239 59.9	37.0	184 15.8	56.9	344 15.5	46.6	52 26.3	39.2	Nunki	75 49.1	S26 16.1	
	02	41 31.5	255 00.4	36.7	199 16.7	57.5	359 18.1	46.5	67 28.9	39.2	Peacock	53 07.1	S56 39.7	
	03	56 33.9	270 00.9	36.4	214 17.6	58.1	14 20.8	46.4	82 31.5	39.3	Pollux	243 18.7	N27 58.1	
	04	71 36.4	285 01.4	36.1	229 18.5	58.8	29 23.5	46.4	97 34.0	39.3	Procyon	244 52.0	N 5 10.0	
	05	86 38.9	300 01.9	35.8	244 19.4	59.4	44 26.2	46.3	112 36.6	39.3				
	06	101 41.3	315 02.4	N10 35.5	259 20.3	S 9 00.0	59 28.9	N14 46.2	127 39.2	S12 39.4	Rasalhague	95 59.6	N12 32.7	
	07	116 43.8	330 02.9	35.2	274 21.2	00.7	74 31.6	46.2	142 41.8	39.4	Regulus	207 35.8	N11 51.2	
	08	131 46.3	345 03.4	34.9	289 22.1	01.3	89 34.3	46.1	157 44.4	39.5	Rigel	281 04.8	S 8 10.2	
	09	146 48.7	0 03.9	34.5	304 23.0	02.0	104 37.0	46.0	172 47.0	39.5	Rigel Kent.	139 42.4	S60 56.0	
	10	161 51.2	15 04.4	34.2	319 23.9	02.6	119 39.6	45.9	187 49.6	39.6	Sabik	102 04.1	S15 45.2	
	11	176 53.6	30 04.8	33.9	334 24.8	03.2	134 42.3	45.9	202 52.1	39.6				
	12	191 56.1	45 05.3	N10 33.6	349 25.7	S 9 03.9	149 45.0	N14 45.8	217 54.7	S12 39.6	Schedar	349 31.7	N56 40.1	
	13	206 58.6	60 05.8	33.3	4 26.6	04.5	164 47.7	45.7	232 57.3	39.7	Shaula	96 11.9	S37 07.3	
	14	222 01.0	75 06.3	33.0	19 27.5	05.1	179 50.4	45.7	247 59.9	39.7	Sirius	258 27.2	S16 44.6	
	15	237 03.5	90 06.8	32.6	34 28.4	05.8	194 53.1	45.6	263 02.5	39.8	Spica	158 23.8	S11 17.0	
	16	252 06.0	105 07.3	32.3	49 29.3	06.4	209 55.8	45.5	278 05.1	39.8	Suhail	222 47.4	S43 31.4	
	17	267 08.4	120 07.8	32.0	64 30.2	07.0	224 58.5	45.4	293 07.7	39.9				
	18	282 10.9	135 08.2	N10 31.7	79 31.1	S 9 07.7	240 01.1	N14 45.4	308 10.2	S12 39.9	Vega	80 34.0	N38 48.6	
	19	297 13.4	150 08.7	31.4	94 32.0	08.3	255 03.8	45.3	323 12.8	39.9	Zuben'ubi	136 57.5	S16 08.3	
	20	312 15.8	165 09.2	31.0	109 32.9	09.0	270 06.5	45.2	338 15.4	40.0				
	21	327 18.3	180 09.7	30.7	124 33.8	09.6	285 09.2	45.1	353 18.0	40.0				
	22	342 20.7	195 10.1	30.4	139 34.7	10.2	300 11.9	45.1	8 20.6	40.1	Venus	214 19.5	h 9 01	
	23	357 23.2	210 10.6	30.1	154 35.6	10.9	315 14.6	45.0	23 23.2	40.1	Mars	158 25.8	12 44	
		Mer.Pass. 23 14.4			v 0.5 d 0.3		v 2.7 d 0.1		v 2.6 d 0.0		Jupiter	317 41.0	2 07	
											Saturn	25 54.2	21 31	

UT	SUN			MOON							Lat.	Twilight		Sunrise	Moonrise														
	GHA		Dec	GHA	v	Dec	d	HP	Naut.	Civil		1	2		3	4													
	°	'	°	'	°	'	°	'	h	m		h	m	h	m	h	m	h	m										
SUNDAY	d h	° <td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td></td>	° <td>'<td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td></td>	' <td>°<td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td></td>	° <td>'<td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td></td>	' <td>h<td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td></td>	h <td>m<td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td></td>	m <td>h<td>m<td>h<td>m<td>h<td>m</td></td></td></td></td></td>	h <td>m<td>h<td>m<td>h<td>m</td></td></td></td></td>	m <td>h<td>m<td>h<td>m</td></td></td></td>	h <td>m<td>h<td>m</td></td></td>	m <td>h<td>m</td></td>	h <td>m</td>	m										
	100	182	31.6	S	3	00.0		342	26.9	10.3	N11	34.1	15.8	59.7	N 72	03	53	05	15	06	22	15	51						
	01	197	31.8			01.0		356	56.2	10.3		11	49.9	15.7	59.7	N 70	04	04	05	17	06	18	16	25					
	02	212	32.1			02.0		11	25.5	10.3		12	05.6	15.7	59.6	68	04	14	05	20	06	15	16	49					
	03	227	32.3			03.0		25	54.8	10.2		12	21.3	15.5	59.6	66	04	21	05	22	06	13	17	09					
	04	242	32.5			03.9		40	24.0	10.2		12	36.8	15.5	59.6	64	04	27	05	23	06	11	17	25					
	05	257	32.7			04.9		54	53.2	10.2		12	52.3	15.3	59.5	62	04	32	05	25	06	09	17	38					
	06	272	32.9	S	3	05.9		69	22.4	10.2	N13	07.6	15.3	59.5	60	04	37	05	26	06	07	17	49	17	51				
	07	287	33.1			06.8		83	51.6	10.1		13	22.9	15.2	59.5	N 58	04	41	05	26	06	06	17	59	18	06			
	08	302	33.3			07.8		98	20.7	10.1		13	38.1	15.1	59.4	56	04	44	05	27	06	04	18	07	18	19			
	09	317	33.5			08.8		112	49.8	10.1		13	53.2	15.0	59.4	54	04	47	05	28	06	03	18	15	18	31			
	10	332	33.7			09.7		127	18.9	10.0		14	08.2	14.9	59.4	52	04	49	05	28	06	02	18	22	18	41			
	11	347	33.9			10.7		141	47.9	10.0		14	23.1	14.8	59.3	50	04	51	05	29	06	01	18	28	18	50			
	12		2	34.1	S	3	11.7	156	16.9	10.0	N14	37.9	14.7	59.3	45	04	55	05	29	05	59	18	42	19	09				
	13		17	34.3		12.6		170	45.9	9.9		14	52.6	14.6	59.3	N 40	04	58	05	30	05	57	18	53	19	25			
	14		32	34.5		13.6		185	14.8	9.9		15	07.2	14.5	59.2	35	05	01	05	30	05	55	19	03	19	38			
	15		47	34.7		14.6		199	43.7	9.9		15	21.7	14.4	59.2	30	05	02	05	29	05	51	19	26	20	10			
	16		62	34.9		15.6		214	12.6	9.8		15	36.1	14.3	59.2	N 10	05	03	05	28	05	49	19	39	20	28			
	17		77	35.1		16.5		228	41.4	9.8		15	50.4	14.2	59.1	0	05	01	05	25	05	46	19	52	20	45			
	18		92	35.3	S	3	17.5	243	10.2	9.7	N16	04.6	14.1	59.1	S 10	04	58	05	23	05	44	20	04	21	01				
	19		107	35.5		18.5		257	38.9	9.7		16	18.7	14.0	59.1	20	04	53	05	19	05	41	20	18	21	19			
	20		122	35.7		19.4		272	07.6	9.7		16	32.7	13.9	59.0	30	04	46	05	14	05	38	20	33	21	40			
	21		137	35.9		20.4		286	36.3	9.7		16	46.6	13.7	59.0	35	04	40	05	10	05	36	20	42	21	52			
	22		152	36.1		21.4		301	05.0	9.6		17	00.3	13.7	58.9	40	04	34	05	06	05	33	20	53	22	07			
	23		167	36.3		22.3		315	33.6	9.5		17	14.0	13.5	58.9	45	04	26	05	01	05	31	21	05	22	24			
	MONDAY	200	182	36.5	S	3	23.3		330	02.1	9.6	N17	27.5	13.5	58.9	S 50	04	16	04	55	05	28	21	20	22	45			
01		197	36.7			24.3		344	30.7	9.5		17	41.0	13.3	58.8	52	04	11	04	52	05	26	21	27	22	55			
02		212	36.9			25.2		358	59.2	9.4		17	54.3	13.2	58.8	54	04	06	04	49	05	25	21	35	23	06			
03		227	37.1			26.2		13	27.6	9.4		18	07.5	13.1	58.8	56	03	59	04	45	05	23	21	44	23	19			
04		242	37.3			27.2		27	56.0	9.4		18	20.6	12.9	58.7	58	03	52	04	41	05	21	21	54	23	34			
05		257	37.5			28.1		42	24.4	9.3		18	33.5	12.9	58.7	S 60	03	44	04	36	05	19	22	05	23	53			
06		272	37.7	S	3	29.1		56	52.7	9.3	N18	46.4	12.7	58.6		Lat.	Sunset	Twilight		Moonset									
07		287	37.9			30.1		71	21.0	9.3		18	59.1	12.6	58.6				Civil	Naut.	1	2	3	4					
08		302	38.1			31.0		85	49.3	9.2		19	11.7	12.5	58.6	MONDAY	N	72	17	15	18	22	19	43	10	58			
09		317	38.3			32.0		100	17.5	9.2		19	24.2	12.3	58.5														
10		332	38.5			33.0		114	45.7	9.1		19	36.5	12.3	58.5														
11		347	38.7			33.9		129	13.8	9.1		19	48.8	12.1	58.5														
12			2	38.9	S	3	34.9	143	41.9	9.0	N20	00.9	11.9	58.4															
13			17	39.1		35.9		158	09.9	9.0		20	12.8	11.9	58.4														
14			32	39.3		36.9		172	37.9	9.0		20	24.7	11.7	58.3														
15			47	39.5		37.8		187	05.9	8.9		20	36.4	11.6	58.3														
16			62	39.7		38.8		201	33.8	8.9		20	48.0	11.5	58.3														
17			77	39.9		39.8		216	01.7	8.9		20	59.5	11.3	58.2														
18			92	40.1	S	3	40.7	230	29.6	8.8	N21	10.8	11.2	58.2															
19			107	40.3		41.7		244	57.4	8.8		21	22.0	11.0	58.1														
20			122	40.5		42.7		259	25.2	8.7		21	33.0	11.0	58.1														
21			137	40.7		43.6		273	52.9	8.7		21	44.0	10.7	58.1														
22			152	40.9		44.6		288	20.6	8.7		21	54.7	10.7	58.0														
23			167	41.1		45.6		302	48.3	8.6		22	05.4	10.5	58.0														
TUESDAY		300	182	41.3	S	3	46.5		317	15.9	8.6	N22	15.9	10.4	58.0	N 40	17	41	18	08	18	40	08	13	09	28			
		01	197	41.5			47.5		331	43.5	8.5		22	26.3	10.2	57.9	35	17	43	18	08	18	38	08	05	09	16		
	02	212	41.7			48.5		346	11.0	8.6		22	36.5	10.1	57.9	30	17	45	18	09	18	36	07	58	09	05			
	03	227	41.9			49.4		0	38.6	8.4		22	46.6	9.9	57.8	20	17	48	18	10	18	35	07	46	08	47			
	04	242	42.1			50.4		15	06.0	8.5		22	56.5	9.9	57.8	N 10	17	50	18	11	18	36	07	35	08	31			
	05	257	42.3			51.4		29	33.5	8.4		23	06.4	9.6	57.8	0	17	53	18	13	18	37	07	25	08	17			
	06	272	42.5	S	3	52.3		44	00.9	8.4	N23	16.0	9.5	57.7	S 10	17	55	18	16	18	41	07	15	08	02				
	07	287	42.7			53.3		58	28.3	8.3		23	25.5	9.4	57.7	20	17	58	18	20	18	46	07	04	07	47			
	08	302	42.9			54.3		72	55.6	8.3		23	34.9	9.3	57.6	30	18	02	18	26	18	54	06	52	07	29			
	09	317	43.1			55.2		87	22.9	8.3		23	44.2	9.1	57.6	35	18	04	18	29	18	59	06	45	07	19			
	10	332	43.3			56.2		101	50.2	8.2		23	53.3	8.9	57.6	40	18	06	18	33	19	05	06	37	07	07			
	11	347	43.5			57.1		116	17.4	8.2		24	02.2	8.8	57.5	45	18	09	18	38	19	14	06	28	06	53			
	12		2	43.7	S	3	58.1	130	44.6	8.2	N24	11.0	8.6	57.5	S 50	18	12	18	45	19	24	06	17	06	36				
	13		17	43.9		59.1		145	11.8	8.1		24	19.6	8.5	57.5	52	18	14	18	48	19	29	06	12	06	29			
	14		32	44.1		00.0		159	38.9	8.																			

UT		ARIES		VENUS −4.7		MARS +1.6		JUPITER −2.8		SATURN +0.5		STARS			
d	h	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
		° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "
WEDNESDAY	4 00	12 25.7	225 11.1	N10 29.7	169 36.5	S 9 11.5	330 17.3	N14 44.9	38 25.7	S12 40.1	Acamar	315 12.2	S40 12.4		
	01	27 28.1	240 11.5	29.4	184 37.4	12.1	345 20.0	44.9	53 28.3	40.2	Achernar	335 20.4	S57 06.9		
	02	42 30.6	255 12.0	29.1	199 38.2	12.8	0 22.7	44.8	68 30.9	40.2	Acrux	173 02.0	S63 13.7		
	03	57 33.1	270 12.5	28.7	214 39.1	13.4	15 25.4	44.7	83 33.5	40.3	Adhara	255 06.7	S28 59.9		
	04	72 35.5	285 12.9	28.4	229 40.0	14.0	30 28.1	44.6	98 36.1	40.3	Aldebaran	290 40.7	N16 33.5		
	05	87 38.0	300 13.4	28.1	244 40.9	14.7	45 30.8	44.6	113 38.7	40.4					
	06	102 40.5	315 13.9	N10 27.7	259 41.8	S 9 15.3	60 33.4	N14 44.5	128 41.2	S12 40.4	Alioth	166 14.4	N55 50.0		
	07	117 42.9	330 14.3	27.4	274 42.7	15.9	75 36.1	44.4	143 43.8	40.4	Alkaid	152 53.3	N49 11.8		
	08	132 45.4	345 14.8	27.1	289 43.6	16.6	90 38.8	44.4	158 46.4	40.5	Alnair	27 33.9	S46 50.0		
	09	147 47.9	0 15.2	26.7	304 44.5	17.2	105 41.5	44.3	173 49.0	40.5	Alnilam	275 38.7	S 1 11.0		
	10	162 50.3	15 15.7	26.4	319 45.4	17.8	120 44.2	44.2	188 51.6	40.6	Alphard	217 49.0	S 8 45.5		
	11	177 52.8	30 16.2	26.1	334 46.3	18.5	135 46.9	44.1	203 54.1	40.6					
	12	192 55.2	45 16.6	N10 25.7	349 47.2	S 9 19.1	150 49.6	N14 44.1	218 56.7	S12 40.6	Alphecca	126 04.9	N26 38.3		
	13	207 57.7	60 17.1	25.4	4 48.1	19.7	165 52.3	44.0	233 59.3	40.7	Alpheratz	357 35.5	N29 13.4		
	14	223 00.2	75 17.5	25.0	19 49.0	20.4	180 55.0	43.9	249 01.9	40.7	Altair	62 00.9	N 8 56.0		
	15	238 02.6	90 18.0	24.7	34 49.9	21.0	195 57.7	43.8	264 04.5	40.8	Ankaa	353 07.8	S42 10.6		
	16	253 05.1	105 18.4	24.4	49 50.8	21.6	211 00.4	43.8	279 07.1	40.8	Antares	112 17.4	S26 29.1		
	17	268 07.6	120 18.9	24.0	64 51.7	22.3	226 03.1	43.7	294 09.6	40.8					
	18	283 10.0	135 19.3	N10 23.7	79 52.6	S 9 22.9	241 05.8	N14 43.6	309 12.2	S12 40.9	Arcturus	145 49.2	N19 03.7		
	19	298 12.5	150 19.8	23.3	94 53.5	23.5	256 08.5	43.5	324 14.8	40.9	Atria	107 12.8	S69 04.4		
	20	313 15.0	165 20.2	23.0	109 54.4	24.2	271 11.2	43.5	339 17.4	41.0	Avior	234 15.4	S59 34.7		
	21	328 17.4	180 20.6	22.6	124 55.3	24.8	286 13.9	43.4	354 20.0	41.0	Bellatrix	278 23.9	N 6 22.4		
	22	343 19.9	195 21.1	22.3	139 56.1	25.4	301 16.6	43.3	9 22.5	41.1	Betelgeuse	270 53.2	N 7 24.8		
	23	358 22.4	210 21.5	21.9	154 57.0	26.1	316 19.3	43.2	24 25.1	41.1					
THURSDAY	5 00	13 24.8	225 22.0	N10 21.6	169 57.9	S 9 26.7	331 22.0	N14 43.2	39 27.7	S12 41.1	Canopus	263 52.8	S52 42.1		
	01	28 27.3	240 22.4	21.2	184 58.8	27.3	346 24.7	43.1	54 30.3	41.2	Capella	280 23.3	N46 01.2		
	02	43 29.7	255 22.8	20.9	199 59.7	28.0	1 27.4	43.0	69 32.9	41.2	Deneb	49 26.3	N45 22.1		
	03	58 32.2	270 23.3	20.5	215 00.6	28.6	16 30.1	42.9	84 35.4	41.3	Denebola	182 26.3	N14 26.5		
	04	73 34.7	285 23.7	20.2	230 01.5	29.2	31 32.8	42.9	99 38.0	41.3	Diphda	348 48.0	S17 51.3		
	05	88 37.1	300 24.1	19.8	245 02.4	29.9	46 35.5	42.8	114 40.6	41.3					
	06	103 39.6	315 24.6	N10 19.5	260 03.3	S 9 30.5	61 38.2	N14 42.7	129 43.2	S12 41.4	Dubhe	193 42.9	N61 37.4		
	07	118 42.1	330 25.0	19.1	275 04.2	31.1	76 40.9	42.7	144 45.8	41.4	Elnath	278 03.1	N28 37.6		
	08	133 44.5	345 25.4	18.7	290 05.1	31.8	91 43.6	42.6	159 48.3	41.5	Eltanin	90 42.8	N51 29.4		
	09	148 47.0	0 25.9	18.4	305 06.0	32.4	106 46.3	42.5	174 50.9	41.5	Enif	33 39.6	N 9 59.1		
	10	163 49.5	15 26.3	18.0	320 06.9	33.0	121 49.0	42.4	189 53.5	41.5	Fomalhaut	15 15.4	S29 29.8		
	11	178 51.9	30 26.7	17.7	335 07.7	33.7	136 51.7	42.4	204 56.1	41.6					
	12	193 54.4	45 27.1	N10 17.3	350 08.6	S 9 34.3	151 54.4	N14 42.3	219 58.7	S12 41.6	Gacrux	171 53.5	S57 14.6		
	13	208 56.9	60 27.6	16.9	5 09.5	34.9	166 57.1	42.2	235 01.2	41.7	Gienah	175 45.0	S17 40.2		
	14	223 59.3	75 28.0	16.6	20 10.4	35.6	181 59.8	42.1	250 03.8	41.7	Hadar	148 38.2	S60 29.2		
	15	239 01.8	90 28.4	16.2	35 11.3	36.2	197 02.5	42.1	265 06.4	41.7	Hamal	327 52.1	N23 34.5		
	16	254 04.2	105 28.8	15.8	50 12.2	36.8	212 05.2	42.0	280 09.0	41.8	Kaus Aust.	83 34.0	S34 22.5		
	17	269 06.7	120 29.2	15.5	65 13.1	37.5	227 07.9	41.9	295 11.5	41.8					
	18	284 09.2	135 29.6	N10 15.1	80 14.0	S 9 38.1	242 10.6	N14 41.8	310 14.1	S12 41.9	Kochab	137 20.7	N74 03.6		
	19	299 11.6	150 30.1	14.7	95 14.9	38.7	257 13.3	41.7	325 16.7	41.9	Markab	13 30.7	N15 20.1		
	20	314 14.1	165 30.5	14.4	110 15.8	39.4	272 16.0	41.7	340 19.3	41.9	Menkar	314 07.0	N 4 11.1		
	21	329 16.6	180 30.9	14.0	125 16.6	40.0	287 18.7	41.6	355 21.9	42.0	Menkent	147 59.3	S36 29.1		
	22	344 19.0	195 31.3	13.6	140 17.5	40.6	302 21.4	41.5	10 24.4	42.0	Miaplacidus	221 39.1	S69 48.5		
	23	359 21.5	210 31.7	13.3	155 18.4	41.3	317 24.1	41.4	25 27.0	42.1					
FRIDAY	6 00	14 24.0	225 32.1	N10 12.9	170 19.3	S 9 41.9	332 26.8	N14 41.4	40 29.6	S12 42.1	Mirfak	308 29.4	N49 56.6		
	01	29 26.4	240 32.5	12.5	185 20.2	42.5	347 29.5	41.3	55 32.2	42.1	Nunki	75 49.1	S26 16.1		
	02	44 28.9	255 32.9	12.1	200 21.1	43.2	2 32.2	41.2	70 34.7	42.2	Peacock	53 07.2	S56 39.7		
	03	59 31.4	270 33.3	11.8	215 22.0	43.8	17 34.9	41.1	85 37.3	42.2	Pollux	243 18.7	N27 58.1		
	04	74 33.8	285 33.7	11.4	230 22.9	44.4	32 37.6	41.1	100 39.9	42.2	Procyon	244 52.0	N 5 10.0		
	05	89 36.3	300 34.1	11.0	245 23.7	45.0	47 40.3	41.0	115 42.5	42.3					
	06	104 38.7	315 34.5	N10 10.6	260 24.6	S 9 45.7	62 43.0	N14 40.9	130 45.0	S12 42.3	Rasalhague	95 59.6	N12 32.7		
	07	119 41.2	330 34.9	10.3	275 25.5	46.3	77 45.7	40.8	145 47.6	42.4	Regulus	207 35.8	N11 51.2		
	08	134 43.7	345 35.3	09.9	290 26.4	46.9	92 48.4	40.8	160 50.2	42.4	Rigel	281 04.8	S 8 10.3		
	09	149 46.1	0 35.7	09.5	305 27.3	47.6	107 51.1	40.7	175 52.8	42.4	Rigel Kent.	139 42.4	S60 56.0		
	10	164 48.6	15 36.1	09.1	320 28.2	48.2	122 53.8	40.6	190 55.4	42.5	Sabik	102 04.1	S15 45.2		
	11	179 51.1	30 36.5	08.7	335 29.1	48.8	137 56.6	40.5	205 57.9	42.5					
	12	194 53.5	45 36.9	N10 08.3	350 30.0	S 9 49.5	152 59.3	N14 40.5	221 00.5	S12 42.6	Schedar	349 31.7	N56 40.1		
	13	209 56.0	60 37.3	08.0	5 30.8	50.1	168 02.0	40.4	236 03.1	42.6	Shaula	96 12.0	S37 07.3		
	14	224 58.5	75 37.7	07.6	20 31.7	50.7	183 04.7	40.3	251 05.7	42.6	Sirius	258 27.2	S16 44.7		
	15	240 00.9	90 38.1	07.2	35 32.6	51.3	198 07.4	40.2	266 08.2	42.7	Spica	158 23.8	S11 17.0		
	16	255 03.4	105 38.5	06.8	50 33.5	52.0	213 10.1	40.1	281 10.8	42.7	Suhail	222 47.4	S43 31.4		
	17	270 05.8	120 38.9	06.4	65 34.4	52.6	228 12.8	40.1	296 13.4	42.8					
	18	285 08.3	135 39.3	N10 06.0	80 35.3	S 9 53.2	243 15.5	N14 40.0	311 16.0	S12 42.8	Vega	80 34.0	N38 48.6		
	19	300 10.8	150 39.6	05.6	95 36.2	53.9	258 18.2	39.9	326 18.5	42.8	Zuben'ubi	136 57.5	S16 08.3		
	20	315 13.2	165 40.0	05.2	110 37.0	54.5	273 20.9	39.8	341 21.1	42.9					
	21	330 15.7	180 40.4	04.9	125 37.9	55.1	288 23.6	39.8	356 23.7	42.9					
	22	345 18.2	195 40.8	04.5	140 38.8	55.8	303 26.3	39.7	11 26.2	42.9	Venus	211 57.1	S 8 58		
	23	0 20.6	210 41.2	04.1	155 39.7	56.4	318 29.1	39.6	26 28.8	43.0	Mars	156 33.1	S 12 39		
h m															
Mer. Pass. 23		02.6	v 0.4	d 0.4	v 0.9	d 0.6	v 2.7	d 0.1	v 2.6	d 0.0					
													Jupiter	317 57.1	S 1 54
													Saturn	26 02.9	S 21 18

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise						
	GHA		Dec		GHA		v			Naut.	Civil		4	5	6	7			
	°	'	°	'	°	'	°	'			h	m	h	m	h	m	h	m	
WEDNESDAY	d h	°	'	°	'	°	'	°	'	N 72	04 08	05 28	06 35						
	00	182	46.0	S 4	09.7	304	09.0	7.9	N25 44.9	6.8	57.0	N 70	04 17	05 29	06 30				
	01	197	46.2		10.7	318	35.9	7.8	25 51.7	6.7	57.0	68	04 25	05 30	06 26				
	02	212	46.4		11.6	333	02.7	7.9	25 58.4	6.5	57.0	66	04 31	05 31	06 22				
	03	227	46.6		12.6	347	29.6	7.8	26 04.9	6.4	56.9	64	04 36	05 32	06 19				
	04	242	46.8		13.6	1	56.4	7.8	26 11.3	6.2	56.9	62	04 41	05 32	06 17	17 20	18 52		
	05	257	47.0		14.5	16	23.2	7.8	26 17.5	6.1	56.9	60	04 44	05 33	06 14	18 10	19 54		
	06	272	47.2	S 4	15.5	30	50.0	7.8	N26 23.6	5.9	56.8	N 58	04 47	05 33	06 12	18 42	19 23		
	07	287	47.4		16.4	45	16.8	7.7	26 29.5	5.7	56.8	56	04 50	05 33	06 10	19 05	19 50		
	08	302	47.6		17.4	59	43.5	7.8	26 35.2	5.6	56.7	54	04 52	05 33	06 09	19 25	20 11		
	09	317	47.8		18.4	74	10.3	7.7	26 40.8	5.5	56.7	52	04 54	05 33	06 07	19 41	20 28		
	10	332	48.0		19.3	88	37.0	7.8	26 46.3	5.3	56.7	50	04 56	05 33	06 06	19 55	20 44		
	11	347	48.2		20.3	103	03.8	7.7	26 51.6	5.1	56.6	45	04 59	05 33	06 02	20 24	21 14		
	12	2 48.4	S 4	21.3		117	30.5	7.7	N26 56.7	5.0	56.6	N 40	05 01	05 33	06 00	20 46	21 37		
	13	17 48.5		22.2		131	57.2	7.7	27 01.7	4.8	56.6	35	05 03	05 32	05 58	21 05	21 57		
	14	32 48.7		23.2		146	23.9	7.8	27 06.5	4.6	56.5	30	05 04	05 32	05 55	21 21	22 14		
	15	47 48.9		24.2		160	50.7	7.7	27 11.1	4.5	56.5	20	05 04	05 30	05 52	21 48	22 42		
	16	62 49.1		25.1		175	17.4	7.7	27 15.6	4.4	56.5	N 10	05 03	05 27	05 48	22 12	23 06		
	17	77 49.3		26.1		189	44.1	7.7	27 20.0	4.2	56.4	0	05 00	05 24	05 45	22 34	23 29		
	18	92 49.5	S 4	27.0		204	10.8	7.7	N27 24.2	4.0	56.4	S 10	04 56	05 21	05 42	22 56	23 51		
	19	107 49.7		28.0		218	37.5	7.7	27 28.2	3.9	56.4	20	04 50	05 16	05 38	23 20	24 16		
	20	122 49.9		29.0		233	04.2	7.8	27 32.1	3.7	56.3	30	04 42	05 10	05 34	23 48	24 44		
	21	137 50.1		29.9		247	31.0	7.7	27 35.8	3.5	56.3	35	04 36	05 06	05 31	24 04	00 04		
	22	152 50.3		30.9		261	57.7	7.7	27 39.3	3.4	56.3	40	04 29	05 01	05 29	24 23	00 23		
	23	167 50.5		31.9		276	24.4	7.8	27 42.7	3.3	56.2	45	04 20	04 56	05 25	24 46	00 46		
THURSDAY	500	182	50.7	S 4	32.8	290	51.2	7.7	N27 46.0	3.1	56.2	S 50	04 09	04 48	05 21	00 05	01 16		
	01	197	50.8		33.8	305	17.9	7.8	27 49.1	2.9	56.2	52	04 04	04 45	05 19	00 18	01 31		
	02	212	51.0		34.8	319	44.7	7.7	27 52.0	2.8	56.1	54	03 58	04 41	05 17	00 33	01 49		
	03	227	51.2		35.7	334	11.4	7.8	27 54.8	2.6	56.1	56	03 51	04 37	05 15	00 50	02 09		
	04	242	51.4		36.7	348	38.2	7.8	27 57.4	2.5	56.1	58	03 43	04 32	05 12	01 11	02 36		
	05	257	51.6		37.6	3 05.0	7.9	27 59.9	2.3	56.0	S 60	03 33	04 27	05 10	01 39	03 13			
	06	272	51.8	S 4	38.6	17	31.9	7.8	N28 02.2	2.1	56.0	Lat.	Sunset	Twilight		Moonset			
	07	287	52.0		39.6	31	58.7	7.8	28 04.3	2.0	56.0			Civil	Naut.	4	5	6	7
	08	302	52.2		40.5	46	25.5	7.9	28 06.3	1.8	55.9	N 72	h m	h m	h m	h m	h m	h m	
	09	317	52.4		41.5	60	52.4	7.9	28 08.1	1.7	55.9								
	10	332	52.6		42.4	75	19.3	7.9	28 09.8	1.5	55.9	N 70	17 05	18 05	19 17				
	11	347	52.7		43.4	89	46.2	8.0	28 11.3	1.4	55.8	68	17 09	18 05	19 10				
	12	2 52.9	S 4	44.4		104	13.2	8.0	N28 12.7	1.2	55.8	66	17 13	18 04	19 04				
	13	17 53.1		45.3		118	40.2	8.0	28 13.9	1.1	55.8	64	17 16	18 03	18 59				
	14	32 53.3		46.3		133	07.2	8.0	28 15.0	0.9	55.7	62	17 19	18 03	18 55	15 13	17 28		
	15	47 53.5		47.3		147	34.2	8.0	28 15.9	0.8	55.7	60	17 22	18 03	18 51	14 23	16 27		
	16	62 53.7		48.2		162	01.2	8.1	28 16.7	0.6	55.7	N 58	17 24	18 03	18 48	13 52	15 06		
	17	77 53.9		49.2		176	28.3	8.2	28 17.3	0.4	55.6	56	17 26	18 03	18 46	13 29	14 39		
	18	92 54.1	S 4	50.1		190	55.5	8.1	N28 17.7	0.3	55.6	54	17 27	18 03	18 44	13 10	14 18		
	19	107 54.2		51.1		205	22.6	8.2	28 18.0	0.2	55.6	52	17 29	18 03	18 42	12 54	14 00		
	20	122 54.4		52.1		219	49.8	8.2	28 18.2	0.0	55.6	50	17 31	18 03	18 40	12 40	13 45		
	21	137 54.6		53.0		234	17.0	8.3	28 18.2	0.2	55.5	45	17 34	18 03	18 37	12 12	13 15		
	22	152 54.8		54.0		248	44.3	8.3	28 18.0	0.3	55.5	N 40	17 37	18 04	18 35	11 50	12 51		
	23	167 55.0		54.9		263	11.6	8.4	28 17.7	0.4	55.5	35	17 39	18 04	18 33	11 31	12 32		
	FRIDAY	600	182	55.2	S 4	55.9	277	39.0	8.3	N28 17.3	0.6	55.4	30	17 41	18 05	18 33	11 16	12 15	
01		197	55.4		56.9	292	06.3	8.5	28 16.7	0.8	55.4	20	17 45	18 07	18 32	10 49	11 47		
02		212	55.6		57.8	306	33.8	8.4	28 15.9	0.9	55.4	N 10	17 48	18 09	18 34	10 26	11 23		
03		227	55.7		58.8	321	01.2	8.6	28 15.0	1.0	55.4	0	17 52	18 12	18 37	10 05	11 00		
04		242	55.9		59.7	335	28.8	8.5	28 14.0	1.2	55.3	S 10	17 55	18 16	18 41	09 44	10 38		
05		257	56.1	5	00.7	349	56.3	8.6	28 12.8	1.3	55.3	20	17 59	18 21	18 47	09 21	10 14		
06		272	56.3	S 5	01.7	4 23.9	8.7	N28 11.5	1.5	55.3	30	18 03	18 28	18 56	08 55	09 46			
07		287	56.5		02.6	18	51.6	8.7	28 10.0	1.6	55.3	35	18 06	18 32	19 02	08 40	09 29		
08		302	56.7		03.6	33	19.3	8.8	28 08.4	1.8	55.2	40	18 09	18 36	19 09	08 22	09 09		
09		317	56.9		04.5	47	47.1	8.8	28 06.6	1.9	55.2	45	18 13	18 42	19 18	08 00	08 46		
10		332	57.0		05.5	62	14.9	8.8	28 04.7	2.1	55.2	S 50	18 17	18 50	19 29	07 33	08 16		
11		347	57.2		06.5	76	42.7	9.0	28 02.6	2.2	55.2	52	18 19	18 53	19 35	07 20	08 01		
12		2 57.4	S 5	07.4		91	10.7	8.9	N28 00.4	2.3	55.1	54	18 21	18 57	19 41	07 04	07 43		
13		17 57.6		08.4		105	38.6	9.1	27 58.1	2.5	55.1	56	18 23	19 01	19 48	06 47	07 22		
14		32 57.8		09.3		120	06.7	9.1	27 55.6	2.6	55.1	58	18 26	19 06	19 56	06 25	06 56		
15		47 58.0		10.3		134	34.8	9.1	27 53.0	2.8	55.1	S 60	18 29	19 12	20 06	05 57	06 19		
16		62 58.1		11.3		149	02.9	9.2	27 50.2	2.9	55.0	SUN		MOON					
17		77 58.3		12.2		163	31.1	9.3	27 47.3	3.0	55.0	Day	Eqn. of Time		Mer. Pass.	Mer. Pass.		Age	Phase
18		92 58.5	S 5	13.2		177	59.4	9.3	N27 44.3	3.2	55.0								
19		107 58.7		14.1		192	27.7	9.4	27 41.1	3.3	55.0								
20		122 58.9		15.1		206	56.1	9.4	27 37.8	3.5	54.9	d	m s	m s	h m	h m	h m	d %	
21		137 59.1		16.0		221	24.5	9.5	27 34.3	3.6	54.9	4	11 04	11 13	11 49	03 52	16 20	19 70	
22		152 59.3		17.0		235	53.0	9.6	27 30.7	3.7	54.9	5	11 22	11 31	11 48	04 47	17 15	20 61	
23		167 59.4		18.0		250	21.6	9.7	N27 27.0	3.8	54.9	6	11 40	11 49	11 48	05 42	18 08	21 51	
		SD	16.0	d	1.0	SD	15.4	15.2	15.0										

UT	ARIES		VENUS −4.6		MARS +1.6		JUPITER −2.8		SATURN +0.6		STARS				
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec		
SATURDAY	7 00	15 23.1	225 41.6	N10 03.7	170 40.6	S 9 57.0	333 31.8	N14 39.5	41 31.4	S12 43.0	Acamar	315 12.2	S40 12.4		
	01	30 25.6	240 41.9	03.3	185 41.5	57.6	348 34.5	39.4	56 34.0	43.1	Achernar	335 20.4	S57 06.9		
	02	45 28.0	255 42.3	02.9	200 42.3	58.3	3 37.2	39.4	71 36.5	43.1	Acrux	173 02.0	S63 13.7		
	03	60 30.5	270 42.7	02.5	215 43.2	58.9	18 39.9	39.3	86 39.1	43.1	Adhara	255 06.7	S28 59.9		
	04	75 33.0	285 43.1	02.1	230 44.1	9 59.5	33 42.6	39.2	101 41.7	43.2	Aldebaran	290 40.6	N16 33.5		
	05	90 35.4	300 43.4	01.7	245 45.0	10 00.2	48 45.3	39.1	116 44.3	43.2					
	06	105 37.9	315 43.8	N10 01.3	260 45.9	S10 00.8	63 48.0	N14 39.1	131 46.8	S12 43.2	Alioth	166 14.4	N55 49.9		
	07	120 40.3	330 44.2	00.9	275 46.8	01.4	78 50.7	39.0	146 49.4	43.3	Alkaid	152 53.3	N49 11.8		
	08	135 42.8	345 44.5	00.5	290 47.6	02.0	93 53.5	38.9	161 52.0	43.3	Alnair	27 33.9	S46 50.9		
	09	150 45.3	0 44.9	10 00.1	305 48.5	02.7	108 56.2	38.8	176 54.6	43.4	Anilam	275 38.7	S 1 11.0		
	10	165 47.7	15 45.3	9 59.7	320 49.4	03.3	123 58.9	38.7	191 57.1	43.4	Alphard	217 49.0	S 8 45.5		
	11	180 50.2	30 45.7	59.3	335 50.3	03.9	139 01.6	38.7	206 59.7	43.4					
	12	195 52.7	45 46.0	N 9 58.9	350 51.2	S10 04.6	154 04.3	N14 38.6	222 02.3	S12 43.5	Alphecca	126 04.9	N26 38.3		
	13	210 55.1	60 46.4	58.5	5 52.1	05.2	169 07.0	38.5	237 04.8	43.5	Alpheratz	357 35.5	N29 13.4		
	14	225 57.6	75 46.7	58.0	20 52.9	05.8	184 09.7	38.4	252 07.4	43.5	Altair	62 00.9	N 8 56.0		
	15	241 00.1	90 47.1	57.6	35 53.8	06.4	199 12.5	38.3	267 10.0	43.6	Ankaa	353 07.7	S42 10.6		
	16	256 02.5	105 47.5	57.2	50 54.7	07.1	214 15.2	38.3	282 12.6	43.6	Antares	112 17.4	S26 29.1		
	17	271 05.0	120 47.8	56.8	65 55.6	07.7	229 17.9	38.2	297 15.1	43.7					
	18	286 07.5	135 48.2	N 9 56.4	80 56.5	S10 08.3	244 20.6	N14 38.1	312 17.7	S12 43.7	Arcturus	145 49.2	N19 03.7		
	19	301 09.9	150 48.5	56.0	95 57.3	08.9	259 23.3	38.0	327 20.3	43.7	Atria	107 12.8	S69 04.4		
	20	316 12.4	165 48.9	55.6	110 58.2	09.6	274 26.0	38.0	342 22.8	43.8	Avior	234 15.4	S59 34.7		
	21	331 14.8	180 49.3	55.2	125 59.1	10.2	289 28.7	37.9	357 25.4	43.8	Bellatrix	278 23.9	N 6 22.4		
	22	346 17.3	195 49.6	54.8	141 00.0	10.8	304 31.5	37.8	12 28.0	43.8	Betelgeuse	270 53.1	N 7 24.8		
	23	1 19.8	210 50.0	54.3	156 00.9	11.5	319 34.2	37.7	27 30.6	43.9					
SUNDAY	8 00	16 22.2	225 50.3	N 9 53.9	171 01.7	S10 12.1	334 36.9	N14 37.6	42 33.1	S12 43.9	Canopus	263 52.8	S52 42.1		
	01	31 24.7	240 50.7	53.5	186 02.6	12.7	349 39.6	37.6	57 35.7	43.9	Capella	280 23.2	N46 01.2		
	02	46 27.2	255 51.0	53.1	201 03.5	13.3	4 42.3	37.5	72 38.3	44.0	Deneb	49 26.4	N45 22.1		
	03	61 29.6	270 51.4	52.7	216 04.4	14.0	19 45.0	37.4	87 40.8	44.0	Denebola	182 26.3	N14 26.5		
	04	76 32.1	285 51.7	52.2	231 05.3	14.6	34 47.8	37.3	102 43.4	44.1	Diphda	348 48.0	S17 51.3		
	05	91 34.6	300 52.1	51.8	246 06.1	15.2	49 50.5	37.2	117 46.0	44.1					
	06	106 37.0	315 52.4	N 9 51.4	261 07.0	S10 15.8	64 53.2	N14 37.2	132 48.6	S12 44.1	Dubhe	193 42.8	N61 37.3		
	07	121 39.5	330 52.8	51.0	276 07.9	16.5	79 55.9	37.1	147 51.1	44.2	Elmath	278 03.1	N28 37.6		
	08	136 41.9	345 53.1	50.6	291 08.8	17.1	94 58.6	37.0	162 53.7	44.2	Eltanin	90 42.8	N51 29.4		
	09	151 44.4	0 53.4	50.1	306 09.6	17.7	110 01.3	36.9	177 56.3	44.2	Enif	33 39.6	N 9 59.1		
	10	166 46.9	15 53.8	49.7	321 10.5	18.3	125 04.1	36.8	192 58.8	44.3	Fomalhaut	15 15.4	S29 29.8		
	11	181 49.3	30 54.1	49.3	336 11.4	19.0	140 06.8	36.8	208 01.4	44.3					
	12	196 51.8	45 54.5	N 9 48.9	351 12.3	S10 19.6	155 09.5	N14 36.7	223 04.0	S12 44.3	Gacrux	171 53.4	S57 14.6		
	13	211 54.3	60 54.8	48.4	6 13.2	20.2	170 12.2	36.6	238 06.5	44.4	Gienah	175 45.0	S17 40.2		
	14	226 56.7	75 55.1	48.0	21 14.0	20.8	185 14.9	36.5	253 09.1	44.4	Hadar	148 38.2	S60 29.2		
	15	241 59.2	90 55.5	47.6	36 14.9	21.5	200 17.7	36.4	268 11.7	44.5	Hamal	327 52.1	N23 34.5		
	16	257 01.7	105 55.8	47.1	51 15.8	22.1	215 20.4	36.4	283 14.2	44.5	Kaus Aust.	83 34.0	S34 22.5		
	17	272 04.1	120 56.1	46.7	66 16.7	22.7	230 23.1	36.3	298 16.8	44.5					
	18	287 06.6	135 56.5	N 9 46.3	81 17.5	S10 23.3	245 25.8	N14 36.2	313 19.4	S12 44.6	Kochab	137 20.8	N74 03.6		
	19	302 09.1	150 56.8	45.8	96 18.4	24.0	260 28.5	36.1	328 21.9	44.6	Markab	13 30.7	N15 20.1		
	20	317 11.5	165 57.1	45.4	111 19.3	24.6	275 31.3	36.0	343 24.5	44.6	Menkar	314 07.0	N 4 11.1		
	21	332 14.0	180 57.5	45.0	126 20.2	25.2	290 34.0	35.9	358 27.1	44.7	Menkent	147 59.3	S36 29.1		
	22	347 16.4	195 57.8	44.5	141 21.0	25.8	305 36.7	35.9	13 29.6	44.7	Miaplacidus	221 39.0	S69 48.5		
	23	2 18.9	210 58.1	44.1	156 21.9	26.5	320 39.4	35.8	28 32.2	44.7					
MONDAY	9 00	17 21.4	225 58.4	N 9 43.7	171 22.8	S10 27.1	335 42.2	N14 35.7	43 34.8	S12 44.8	Mirfak	308 29.4	N49 56.7		
	01	32 23.8	240 58.8	43.2	186 23.7	27.7	350 44.9	35.6	58 37.4	44.8	Nunki	75 49.1	S26 16.1		
	02	47 26.3	255 59.1	42.8	201 24.5	28.3	5 47.6	35.5	73 39.9	44.8	Peacock	53 07.2	S56 39.7		
	03	62 28.8	270 59.4	42.3	216 25.4	29.0	20 50.3	35.5	88 42.5	44.9	Pollux	243 18.7	N27 58.1		
	04	77 31.2	285 59.7	41.9	231 26.3	29.6	35 53.0	35.4	103 45.1	44.9	Procyon	244 52.0	N 5 10.0		
	05	92 33.7	301 00.1	41.4	246 27.2	30.2	50 55.8	35.3	118 47.6	44.9					
	06	107 36.2	316 00.4	N 9 41.0	261 28.0	S10 30.8	65 58.5	N14 35.2	133 50.2	S12 45.0	Rasalhague	95 59.7	N12 32.7		
	07	122 38.6	331 00.7	40.6	276 28.9	31.5	81 01.2	35.1	148 52.8	45.0	Regulus	207 35.8	N11 51.2		
	08	137 41.1	346 01.0	40.1	291 29.8	32.1	96 03.9	35.1	163 55.3	45.1	Rigel	281 04.7	S 8 10.3		
	09	152 43.6	0 01.3	39.7	306 30.7	32.7	111 06.7	35.0	178 57.9	45.1	Rigil Kent.	139 42.4	S60 56.0		
	10	167 46.0	16 01.7	39.2	321 31.5	33.3	126 09.4	34.9	194 00.4	45.1	Sabik	102 04.2	S15 45.2		
	11	182 48.5	31 02.0	38.8	336 32.4	33.9	141 12.1	34.8	209 03.0	45.2					
	12	197 50.9	46 02.3	N 9 38.3	351 33.3	S10 34.6	156 14.8	N14 34.7	224 05.6	S12 45.2	Schedar	349 31.7	N56 40.1		
	13	212 53.4	61 02.6	37.9	6 34.2	35.2	171 17.6	34.6	239 08.1	45.2	Shaula	96 12.0	S37 07.3		
	14	227 55.9	76 02.9	37.4	21 35.0	35.8	186 20.3	34.6	254 10.7	45.3	Sirius	258 27.1	S16 44.7		
	15	242 58.3	91 03.2	37.0	36 35.9	36.4	201 23.0	34.5	269 13.3	45.3	Spica	158 23.7	S11 17.0		
	16	258 00.8	106 03.5	36.5	51 36.8	37.1	216 25.7	34.4	284 15.8	45.3	Suhail	222 47.3	S43 31.3		
	17	273 03.3	121 03.8	36.1	66 37.6	37.7	231 28.5	34.3	299 18.4	45.4					
	18	288 05.7	136 04.1	N 9 35.6	81 38.5	S10 38.3	246 31.2	N14 34.2	314 21.0	S12 45.4	Vega	80 34.0	N38 48.6		
	19	303 08.2	151 04.4	35.2	96 39.4	38.9	261 33.9	34.2	329 23.5	45.4	Zuben'ubi	136 57.5	S16 08.3		
	20	318 10.7	166 04.8	34.7	111 40.3	39.6	276 36.6	34.1	344 26.1	45.5					
	21	333 13.1	181 05.1	34.2	126 41.1	40.2	291 39.4	34.0	359 28.7	45.5					
	22	348 15.6	196 05.4	33.8	141 42.0	40.8	306 42.1	33.9	14 31.2	45.5	Venus	209 28.1	h 8 56		
	23	3 18.0	211 05.7	33.3	156 42.9	41.4	321 44.8	33.8	29 33.8	45.6	Mars	154 39.5	h 12 35		
		h m									Jupiter	318 14.7	h 1 41		
Mer. Pass. 22 50.8		v 0.3	d 0.4		v 0.9	d 0.6		v 2.7	d 0.1		v 2.6	d 0.0	Saturn	26 10.9	21 06

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise														
	GHA		Dec		GHA		v Dec d HP			Naut.	Civil		7	8	9	10											
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m										
SATURDAY	7 00	182	59.6	S 5	18.9	264	50.3	9.7	N27 23.2	4.0	54.9	N 70	04 22	05 41	06 49												
	01	197	59.8		19.9	279	19.0	9.7	27 19.2	4.1	54.8	N 72	04 30	05 41	06 42			22 21	24 46								
	02	213	00.0		20.8	293	47.7	9.9	27 15.1	4.3	54.8	68	04 36	05 41	06 37			23 04	25 05								
	03	228	00.2		21.8	308	16.6	9.9	27 10.8	4.4	54.8	66	04 41	05 41	06 32		21 23	23 33	25 20								
	04	243	00.3		22.8	322	45.5	10.0	27 06.4	4.5	54.8	64	04 45	05 40	06 28	19 45	22 05	23 54	25 33								
	05	258	00.5		23.7	337	14.5	10.0	27 01.9	4.6	54.8	62	04 49	05 40	06 24	20 49	22 34	24 11	00 11								
	06	273	00.7	S 5	24.7	351	43.5	10.1	N26 57.3	4.8	54.7	60	04 51	05 40	06 21	21 23	22 55	24 25	00 25								
	07	288	00.9		25.6	6	12.6	10.2	26 52.5	4.9	54.7	N 58	04 54	05 39	06 19	21 48	23 13	24 37	00 37								
	08	303	01.1		26.6	20	41.8	10.3	26 47.6	5.0	54.7	56	04 56	05 39	06 16	22 08	23 28	24 48	00 48								
	09	318	01.3		27.5	35	11.1	10.3	26 42.6	5.1	54.7	54	04 58	05 39	06 14	22 24	23 40	24 57	00 57								
	10	333	01.4		28.5	49	40.4	10.4	26 37.5	5.3	54.7	52	04 59	05 38	06 12	22 38	23 51	25 05	01 05								
	11	348	01.6		29.5	64	09.8	10.4	26 32.2	5.4	54.6	50	05 00	05 38	06 10	22 50	24 01	00 01	01 12								
	12	3	01.8	S 5	30.4	78	39.2	10.6	N26 26.8	5.5	54.6	45	05 03	05 37	06 06	23 16	24 22	00 22	01 28								
	13	18	02.0		31.4	93	08.8	10.6	26 21.3	5.6	54.6	N 40	05 04	05 36	06 03	23 36	24 38	00 38	01 41								
	14	33	02.2		32.3	107	38.4	10.7	26 15.7	5.8	54.6	35	05 05	05 35	06 00	23 53	24 52	00 52	01 51								
	15	48	02.3		33.3	122	08.1	10.7	26 09.9	5.9	54.6	30	05 06	05 33	05 57	24 07	00 07	01 04	02 01								
	16	63	02.5		34.2	136	37.8	10.9	26 04.0	6.0	54.6	20	05 05	05 30	05 53	24 32	00 32	01 25	02 17								
	17	78	02.7		35.2	151	07.7	10.9	25 58.0	6.1	54.5	N 10	05 03	05 27	05 48	00 00	00 53	01 43	02 31								
	18	93	02.9	S 5	36.1	165	37.6	10.9	N25 51.9	6.2	54.5	0	04 59	05 24	05 44	00 22	01 12	01 59	02 44								
	19	108	03.1		37.1	180	07.5	11.1	25 45.7	6.3	54.5	S 10	04 54	05 19	05 40	00 44	01 32	02 16	02 57								
	20	123	03.2		38.1	194	37.6	11.1	25 39.4	6.5	54.5	20	04 48	05 13	05 36	01 07	01 53	02 34	03 10								
	21	138	03.4		39.0	209	07.7	11.2	25 32.9	6.6	54.5	30	04 38	05 06	05 30	01 34	02 17	02 54	03 26								
	22	153	03.6		40.0	223	37.9	11.3	25 26.3	6.7	54.5	35	04 32	05 02	05 27	01 50	02 31	03 06	03 35								
23	168	03.8		40.9	238	08.2	11.4	25 19.6	6.8	54.5	40	04 24	04 56	05 24	02 08	02 47	03 19	03 46									
SUNDAY	8 00	183	03.9	S 5	41.9	252	38.6	11.4	N25 12.8	6.9	54.4	S 50	04 02	04 42	05 15	02 59	03 31	03 54	04 12								
	01	198	04.1		42.8	267	09.0	11.5	25 05.9	7.0	54.4	52	03 56	04 38	05 12	03 12	03 42	04 03	04 19								
	02	213	04.3		43.8	281	39.5	11.6	24 58.9	7.2	54.4	54	03 49	04 34	05 10	03 28	03 56	04 14	04 27								
	03	228	04.5		44.7	296	10.1	11.6	24 51.7	7.2	54.4	56	03 42	04 29	05 07	03 47	04 11	04 25	04 35								
	04	243	04.7		45.7	310	40.7	11.8	24 44.5	7.4	54.4	58	03 33	04 23	05 04	04 11	04 29	04 39	04 44								
	05	258	04.8		46.6	325	11.5	11.8	24 37.1	7.4	54.4	S 60	03 22	04 17	05 00	04 41	04 51	04 54	04 55								
	06	273	05.0	S 5	47.6	339	42.3	11.9	N24 29.7	7.6	54.4	Lat.		Sunset		Twilight		Moonset									
	07	288	05.2		48.6	354	13.2	11.9	24 22.1	7.7	54.3					Civil		Naut.		7		8		9		10	
	08	303	05.4		49.5	8	44.1	12.1	24 14.4	7.8	54.3																
	09	318	05.5		50.5	23	15.2	12.1	24 06.6	7.8	54.3																
	10	333	05.7		51.4	37	46.3	12.2	23 58.8	8.0	54.3																
	11	348	05.9		52.4	52	17.5	12.2	23 50.8	8.1	54.3																
	12	3	06.1	S 5	53.3	66	48.7	12.4	N23 42.7	8.2	54.3	N 72	16 44	17 52	19 10				18 33								
	13	18	06.2		54.3	81	20.1	12.4	23 34.5	8.3	54.3	N 70	16 51	17 52	19 03			19 03	18 06								
	14	33	06.4		55.2	95	51.5	12.4	23 26.2	8.4	54.3	68	16 57	17 52	18 57			18 18	17 45								
	15	48	06.6		56.2	110	22.9	12.6	23 17.8	8.5	54.3	66	17 02	17 53	18 52		18 25	17 49	17 28								
	16	63	06.8		57.1	124	54.5	12.6	23 09.3	8.6	54.3	64	17 06	17 53	18 48	18 23	17 42	17 26	17 15								
	17	78	06.9		58.1	139	26.1	12.8	23 00.7	8.7	54.2	62	17 09	17 54	18 45	17 19	17 13	17 08	17 03								
	18	93	07.1	S 5	59.0	153	57.9	12.7	N22 52.0	8.8	54.2	60	17 13	17 54	18 42	16 44	16 51	16 53	16 53								
	19	108	07.3		60.0	168	29.6	12.9	22 43.2	8.8	54.2	N 58	17 15	17 55	18 40	16 19	16 32	16 40	16 45								
	20	123	07.5		00.9	183	01.5	12.9	22 34.4	9.0	54.2	56	17 18	17 55	18 38	15 58	16 17	16 29	16 37								
	21	138	07.6		01.9	197	33.4	13.0	22 25.4	9.1	54.2	54	17 20	17 55	18 36	15 41	16 04	16 19	16 30								
	22	153	07.8		02.9	212	05.4	13.1	22 16.3	9.1	54.2	52	17 22	17 56	18 35	15 27	15 52	16 10	16 24								
23	168	08.0		03.8	226	37.5	13.2	22 07.2	9.3	54.2	50	17 24	17 56	18 34	15 14	15 42	16 03	16 19									
MONDAY	9 00	183	08.2	S 6	04.8	241	09.7	13.2	N21 57.9	9.3	54.2	45	17 28	17 58	18 31	14 48	15 20	15 46	16 06								
	01	198	08.3		05.7	255	41.9	13.3	21 48.6	9.4	54.2	N 40	17 32	17 59	18 30	14 27	15 03	15 32	15 56								
	02	213	08.5		06.7	270	14.2	13.3	21 39.2	9.6	54.2	35	17 35	18 00	18 29	14 10	14 48	15 20	15 48								
	03	228	08.7		07.6	284	46.5	13.5	21 29.6	9.6	54.2	30	17 38	18 01	18 29	13 55	14 35	15 10	15 40								
	04	243	08.9		08.6	299	19.0	13.5	21 20.0	9.7	54.2	20	17 42	18 04	18 30	13 29	14 13	14 52	15 27								
	05	258	09.0		09.5	313	51.5	13.5	21 10.3	9.7	54.2	N 10	17 47	18 08	18 32	13 07	13 54	14 36	15 15								
	06	273	09.2	S 6	10.5	328	24.0	13.7	N21 00.6	9.9	54.1	0	17 51	18 12	18 36	12 47	13 35	14 21	15 04								
	07	288	09.4		11.4	342	56.7	13.7	20 50.7	10.0	54.1	S 10	17 55	18 16	18 41	12 26	13 17	14 06	14 53								
	08	303	09.5		12.4	357	29.4	13.8	20 40.7	10.0	54.1	20	18 00	18 22	18 48	12 03	12 58	13 50	14 41								
	09	318	09.7		13.3	12	02.2	13.8	20 30.7	10.1	54.1	30	18 05	18 29	18 58	11 37	12 35	13 32	14 27								
	10	333	09.9		14.3	26	35.0	14.0	20 20.6	10.2	54.1	35	18 08	18 34	19 04	11 22	12 21	13 21	14 19								
	11	348	10.1		15.2	41	08.0	13.9	20 10.4	10.3	54.1	40	18 12	18 40	19 12	11 04	12 06	13 08	14 10								
	12	3	10.2	S 6	16.2	55	40.9	14.1	N20 00.1	10.3	54.1	45	18 16	18 46	19 22	10 42	11 47	12 54	13 59								
	13	18	10.4		17.1	70	14.0	14.1	19 49.8	10.5	54.1	S 50	18 22	18 59	19 41	10 11	11 13	12 27	13 40								
	14	33	10.6		18.1	84	47.1	14.2	19 39.3	10.5	54.1	52	18 24	18 59	19 48	09 45	11 00	12 17	13 33								
	15	48	10.7		19.0	99	20.3	14.2	19 28.8	10.6	54.1	54	18 27	19 03	19 48	09 45	11 00	12 17	13 33								
	16	63	10.9		20.0	113	53.5	14.3	19 18.2	10.7	54.1	56	18 29	19 08	19 56	09 26	10 45	12 06	13 26								
	17	78	11.1		20.9	128	26.8	14.4	19 07.5	10.7	54.1	58	18 33	19 14	20 05	09 04	10 28	11 54	13 17								
	18	93	11.3	S 6	21.9	143	00.2	14.4	N18 56.8	10.8	54.1	S 60	18 36	19													

2023 OCTOBER 10, 11, 12 (TUES., WED., THURS.)															
UT	ARIES		VENUS -4.6		MARS +1.6		JUPITER -2.9		SATURN +0.6		STARS				
d h	GHA		GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec		
	° /	'	° /	'	° /	'	° /	'	° /	'		° /	'		
10	00	18 20.5	226 06.0	N 9 32.9	171 43.7	S10 42.0	336 47.6	N14 33.7	44 36.4	S12 45.6	Acamar	315 12.2	S40 12.4		
	01	33 23.0	241 06.3		32.4	186 44.6	42.7	351 50.3	33.7	59 38.9	45.6	Achernar	335 20.4	S57 06.9	
	02	48 25.4	256 06.6		31.9	201 45.5	43.3	6 53.0	33.6	74 41.5	45.7	Acrux	173 02.0	S63 13.7	
	03	63 27.9	271 06.9		31.5	216 46.3	43.9	21 55.7	33.5	89 44.0	45.7	Adhara	255 06.7	S28 59.9	
	04	78 30.4	286 07.2		31.0	231 47.2	44.5	36 58.5	33.4	104 46.6	45.7	Aldebaran	290 40.6	N16 33.5	
05	93 32.8	301 07.5		30.6	246 48.1	45.1	52 01.2	33.3	119 49.2	45.8					
06	108 35.3	316 07.7	N 9 30.1		261 49.0	S10 45.8	67 03.9	N14 33.2	134 51.7	S12 45.8	Alioth	166 14.4	N55 49.9		
07	123 37.8	331 08.0		29.6	276 49.8	46.4	82 06.7	33.2	149 54.3	45.8	Alkaid	152 53.3	N49 11.8		
08	138 40.2	346 08.3		29.2	291 50.7	47.0	97 09.4	33.1	164 56.9	45.9	Alnair	27 33.9	S46 50.9		
09	153 42.7	1 08.6		28.7	306 51.6	47.6	112 12.1	33.0	179 59.4	45.9	Alnilam	275 38.7	S 1 11.0		
10	168 45.2	16 08.9		28.2	321 52.4	48.3	127 14.8	32.9	195 02.0	45.9	Alphard	217 49.0	S 8 45.5		
11	183 47.6	31 09.2		27.8	336 53.3	48.9	142 17.6	32.8	210 04.6	46.0					
12	198 50.1	46 09.5	N 9 27.3		351 54.2	S10 49.5	157 20.3	N14 32.7	225 07.1	S12 46.0	Alphecca	126 04.9	N26 38.3		
13	213 52.5	61 09.8		26.8	6 55.0	50.1	172 23.0	32.7	240 09.7	46.0	Alpheratz	357 35.5	N29 13.4		
14	228 55.0	76 10.1		26.3	21 55.9	50.7	187 25.8	32.6	255 12.2	46.1	Altair	62 00.9	N 8 56.0		
15	243 57.5	91 10.4		25.9	36 56.8	51.4	202 28.5	32.5	270 14.8	46.1	Ankaa	353 07.7	S42 10.6		
16	258 59.9	106 10.6		25.4	51 57.6	52.0	217 31.2	32.4	285 17.4	46.1	Antares	112 17.4	S26 29.1		
17	274 02.4	121 10.9		24.9	66 58.5	52.6	232 34.0	32.3	300 19.9	46.2					
18	289 04.9	136 11.2	N 9 24.4		81 59.4	S10 53.2	247 36.7	N14 32.2	315 22.5	S12 46.2	Arcturus	145 49.2	N19 03.7		
19	304 07.3	151 11.5		24.0	97 00.2	53.8	262 39.4	32.2	330 25.0	46.2	Atria	107 12.9	S69 04.4		
20	319 09.8	166 11.8		23.5	112 01.1	54.5	277 42.2	32.1	345 27.6	46.3	Avior	234 15.4	S59 34.7		
21	334 12.3	181 12.1		23.0	127 02.0	55.1	292 44.9	32.0	0 30.2	46.3	Bellatrix	278 23.9	N 6 22.4		
22	349 14.7	196 12.3		22.5	142 02.8	55.7	307 47.6	31.9	15 32.7	46.3	Betelgeuse	270 53.1	N 7 24.8		
23	4 17.2	211 12.6		22.1	157 03.7	56.3	322 50.4	31.8	30 35.3	46.4					
11	00	19 19.7	226 12.9	N 9 21.6	172 04.6	S10 56.9	337 53.1	N14 31.7	45 37.8	S12 46.4	Canopus	263 52.7	S52 42.1		
	01	34 22.1	241 13.2		21.1	187 05.4	57.5	352 55.8	31.6	60 40.4	46.4	Capella	280 23.2	N46 01.2	
	02	49 24.6	256 13.4		20.6	202 06.3	58.2	7 58.6	31.6	75 43.0	46.5	Deneb	49 26.4	N45 22.1	
	03	64 27.0	271 13.7		20.1	217 07.2	58.8	23 01.3	31.5	90 45.5	46.5	Denebola	182 26.3	N14 26.5	
	04	79 29.5	286 14.0		19.6	232 08.0	59.4	38 04.0	31.4	105 48.1	46.5	Diphda	348 48.0	S17 51.3	
05	94 32.0	301 14.3		19.2	247 08.9	60.0	53 06.8	31.3	120 50.6	46.6					
06	109 34.4	316 14.5	N 9 18.7		262 09.8	S11 00.6	68 09.5	N14 31.2	135 53.2	S12 46.6	Dubhe	193 42.8	N61 37.3		
07	124 36.9	331 14.8		18.2	277 10.6	01.3	83 12.2	31.1	150 55.8	46.6	Elnath	278 03.0	N28 37.6		
08	139 39.4	346 15.1		17.7	292 11.5	01.9	98 15.0	31.1	165 58.3	46.7	Eltanin	90 42.9	N51 29.4		
09	154 41.8	1 15.4		17.2	307 12.4	02.5	113 17.7	31.0	181 00.9	46.7	Enif	33 39.6	N 9 59.1		
10	169 44.3	16 15.6		16.7	322 13.2	03.1	128 20.4	30.9	196 03.4	46.7	Fomalhaut	15 15.4	S29 29.8		
11	184 46.8	31 15.9		16.2	337 14.1	03.7	143 23.2	30.8	211 06.0	46.8					
12	199 49.2	46 16.2	N 9 15.7		352 14.9	S11 04.4	158 25.9	N14 30.7	226 08.6	S12 46.8	Gacrux	171 53.4	S57 14.6		
13	214 51.7	61 16.4		15.2	7 15.8	05.0	173 28.6	30.6	241 11.1	46.8	Gienah	175 45.0	S17 40.2		
14	229 54.1	76 16.7		14.8	22 16.7	05.6	188 31.4	30.5	256 13.7	46.8	Hadar	148 38.2	S60 29.2		
15	244 56.6	91 16.9		14.3	37 17.5	06.2	203 34.1	30.5	271 16.2	46.9	Hamal	327 52.1	N23 34.6		
16	259 59.1	106 17.2		13.8	52 18.4	06.8	218 36.9	30.4	286 18.8	46.9	Kaus Aust.	83 34.0	S34 22.5		
17	275 01.5	121 17.5		13.3	67 19.3	07.4	233 39.6	30.3	301 21.4	46.9					
18	290 04.0	136 17.7	N 9 12.8		82 20.1	S11 08.1	248 42.3	N14 30.2	316 23.9	S12 47.0	Kochab	137 20.8	N74 03.6		
19	305 06.5	151 18.0		12.3	97 21.0	08.7	263 45.1	30.1	331 26.5	47.0	Markab	13 30.7	N15 20.1		
20	320 08.9	166 18.3		11.8	112 21.8	09.3	278 47.8	30.0	346 29.0	47.0	Menkar	314 07.0	N 4 11.1		
21	335 11.4	181 18.5		11.3	127 22.7	09.9	293 50.5	29.9	1 31.6	47.1	Menkent	147 59.3	S36 29.1		
22	350 13.9	196 18.8		10.8	142 23.6	10.5	308 53.3	29.9	16 34.1	47.1	Miaplacidus	221 39.0	S69 48.5		
23	5 16.3	211 19.0		10.3	157 24.4	11.1	323 56.0	29.8	31 36.7	47.1					
12	00	20 18.8	226 19.3	N 9 09.8	172 25.3	S11 11.8	338 58.8	N14 29.7	46 39.3	S12 47.2	Mirfak	308 29.4	N49 56.7		
	01	35 21.3	241 19.5		09.3	187 26.2	12.4	354 01.5	29.6	61 41.8	47.2	Nunki	75 49.1	S26 16.1	
	02	50 23.7	256 19.8		08.8	202 27.0	13.0	9 04.2	29.5	76 44.4	47.2	Peacock	53 07.2	S56 39.7	
	03	65 26.2	271 20.0		08.3	217 27.9	13.6	24 07.0	29.4	91 46.9	47.3	Pollux	243 18.6	N27 58.1	
	04	80 28.6	286 20.3		07.8	232 28.7	14.2	39 09.7	29.3	106 49.5	47.3	Procyon	244 52.0	N 5 10.0	
05	95 31.1	301 20.5		07.3	247 29.6	14.8	54 12.5	29.3	121 52.0	47.3					
06	110 33.6	316 20.8	N 9 06.8		262 30.5	S11 15.5	69 15.2	N14 29.2	136 54.6	S12 47.3	Rasalhague	95 59.7	N12 32.7		
07	125 36.0	331 21.0		06.2	277 31.3	16.1	84 17.9	29.1	151 57.2	47.4	Regulus	207 35.8	N11 51.2		
08	140 38.5	346 21.3		05.7	292 32.2	16.7	99 20.7	29.0	166 59.7	47.4	Rigel	281 04.7	S 8 10.3		
09	155 41.0	1 21.5		05.2	307 33.0	17.3	114 23.4	28.9	182 02.3	47.4	Rigil Kent.	139 42.4	S60 56.0		
10	170 43.4	16 21.8		04.7	322 33.9	17.9	129 26.2	28.8	197 04.8	47.5	Sabik	102 04.2	S15 45.2		
11	185 45.9	31 22.0		04.2	337 34.8	18.5	144 28.9	28.7	212 07.4	47.5					
12	200 48.4	46 22.3	N 9 03.7		352 35.6	S11 19.1	159 31.6	N14 28.6	227 09.9	S12 47.5	Schedar	349 31.7	N56 40.1		
13	215 50.8	61 22.5		03.2	7 36.5	19.8	174 34.4	28.6	242 12.5	47.6	Shaula	96 12.0	S37 07.3		
14	230 53.3	76 22.8		02.7	22 37.3	20.4	189 37.1	28.5	257 15.0	47.6	Sirius	258 27.1	S16 44.7		
15	245 55.7	91 23.0		02.2	37 38.2	21.0	204 39.9	28.4	272 17.6	47.6	Spica	158 23.7	S11 17.0		
16	260 58.2	106 23.2		01.6	52 39.0	21.6	219 42.6	28.3	287 20.2	47.7	Suhail	222 47.3	S43 31.3		
17	276 00.7	121 23.5		01.1	67 39.9	22.2	234 45.4	28.2	302 22.7	47.7					
18	291 03.1	136 23.7	N 9 00.6		82 40.8	S11 22.8	249 48.1	N14 28.1	317 25.3	S12 47.7	Vega	80 34.0	N38 48.6		
19	306 05.6	151 24.0		00.1	97 41.6	23.4	264 50.8	28.0	332 27.8	47.7	Zuben'ubi	136 57.5	S16 08.3		
20	321 08.1	166 24.2		8 59.6	112 42.5	24.1	279 53.6	28.0	347 30.4	47.8					
21	336 10.5	181 24.4		59.1	127 43.3	24.7	294 56.3	27.9	2 32.9	47.8		SHA	Mer. Pass.		
22	351 13.0	196 24.7		58.5	142 44.2	25.3	309 59.1	27.8	17 35.5	47.8	Venus	206 53.2	h 8 55		
23	6 15.5	211 24.9		58.0	157 45.0	25.9	325 01.8	27.7	32 38.0	47.9	Mars	152 44.9	12 31		
h m															
Mer. Pass. 22 39.0		v 0.3 d 0.5		v 0.9 d 0.6		v 2.7 d 0.1		v 2.6 d 0.0				Jupiter		318 33.4	1 28
												Saturn		26 18.2	20 54

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise																
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	10	11	12	13												
	°	'		°	'																								
TUESDAY	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m									
	1000	183	12.3	S	6	27.6	230	21.7	14.8	N17	50.7	11.2	54.1	N	72	04	36	05	55	07	03	□	00	21	02	33	04	33	
	01	198	12.4			28.5	244	55.5	14.9	17	39.5	11.4	54.1	N	70	04	42	05	53	06	55	24	46	00	46	02	44	04	35
	02	213	12.6			29.5	259	29.4	14.9	17	28.1	11.4	54.1	68	04	47	05	51	06	48	25	05	01	05	02	53	04	36	
	03	228	12.8			30.4	274	03.3	15.0	17	16.7	11.4	54.1	66	04	51	05	50	06	42	25	20	01	20	03	00	04	37	
	04	243	12.9			31.4	288	37.3	15.0	17	05.3	11.6	54.1	64	04	54	05	49	06	37	25	33	01	33	03	06	04	38	
	05	258	13.1			32.3	303	11.3	15.1	16	53.7	11.6	54.1	62	04	57	05	48	06	32	00	11	01	43	03	11	04	38	
	06	273	13.3	S	6	33.2	317	45.4	15.1	N16	42.1	11.6	54.1	60	04	59	05	47	06	29	00	25	01	52	03	16	04	39	
	07	288	13.4			34.2	332	19.5	15.2	16	30.5	11.8	54.1	N	58	05	00	05	46	06	25	00	37	02	00	03	20	04	39
	08	303	13.6			35.1	346	53.7	15.3	16	18.7	11.8	54.1	56	05	02	05	45	06	22	00	48	02	06	03	23	04	40	
	09	318	13.8			36.1	1	28.0	15.3	16	06.9	11.8	54.1	54	05	03	05	44	06	20	00	57	02	12	03	26	04	40	
	10	333	13.9			37.0	16	02.3	15.3	15	55.1	11.9	54.1	52	05	04	05	43	06	17	01	05	02	18	03	29	04	41	
	11	348	14.1			38.0	30	36.6	15.4	15	43.2	12.0	54.1	50	05	05	05	43	06	15	01	12	02	23	03	32	04	41	
	12	3	14.3	S	6	38.9	45	11.0	15.5	N15	31.2	12.1	54.1	45	05	07	05	41	06	10	01	28	02	33	03	37	04	42	
	13	18	14.4			39.9	59	45.5	15.5	15	19.1	12.1	54.1	N	40	05	07	05	39	06	06	01	41	02	42	03	42	04	42
	14	33	14.6			40.8	74	20.0	15.5	15	07.0	12.1	54.1	35	05	08	05	37	06	02	01	51	02	49	03	46	04	43	
	15	48	14.8			41.8	88	54.5	15.6	14	54.9	12.3	54.1	30	05	07	05	35	05	59	02	01	02	56	03	50	04	43	
	16	63	14.9			42.7	103	29.1	15.6	14	42.6	12.2	54.1	20	05	06	05	31	05	53	02	17	03	07	03	56	04	44	
	17	78	15.1			43.7	118	03.7	15.7	14	30.4	12.4	54.1	N	10	05	03	05	27	05	48	02	31	03	16	04	01	04	45
	18	93	15.3	S	6	44.6	132	38.4	15.7	N14	18.0	12.4	54.1	0	04	59	05	23	05	44	02	44	03	26	04	06	04	46	
	19	108	15.4			45.6	147	13.1	15.8	14	05.6	12.4	54.1	S	10	04	53	05	17	05	39	02	57	03	35	04	11	04	46
	20	123	15.6			46.5	161	47.9	15.8	13	53.2	12.5	54.1	20	04	45	05	11	05	33	03	10	03	44	04	16	04	47	
	21	138	15.8			47.4	176	22.7	15.9	13	40.7	12.6	54.1	30	04	34	05	03	05	27	03	26	03	55	04	22	04	48	
	22	153	15.9			48.4	190	57.6	15.9	13	28.1	12.6	54.1	35	04	27	04	58	05	23	03	35	04	01	04	26	04	49	
	23	168	16.1			49.3	205	32.5	15.9	13	15.5	12.7	54.1	40	04	19	04	52	05	19	03	46	04	09	04	29	04	49	
WEDNESDAY	00	183	16.3	S	6	50.3	220	07.4	16.0	N13	02.8	12.7	54.1	45	04	08	04	44	05	14	03	58	04	17	04	34	04	50	
	01	198	16.4			51.2	234	42.4	16.0	12	50.1	12.8	54.1	S	50	03	55	04	35	05	08	04	12	04	27	04	39	04	51
	02	213	16.6			52.2	249	17.4	16.1	12	37.3	12.8	54.1	52	03	48	04	31	05	06	04	19	04	31	04	42	04	51	
	03	228	16.8			53.1	263	52.5	16.1	12	24.5	12.8	54.1	54	03	41	04	26	05	03	04	27	04	36	04	44	04	52	
	04	243	16.9			54.1	278	27.6	16.1	12	11.7	13.0	54.2	56	03	32	04	21	04	59	04	35	04	42	04	47	04	52	
	05	258	17.1			55.0	293	02.7	16.2	11	58.7	12.9	54.2	58	03	23	04	14	04	56	04	44	04	48	04	50	04	52	
	06	273	17.2	S	6	55.9	307	37.9	16.2	N11	45.8	13.0	54.2	S	60	03	11	04	07	04	51	04	55	04	55	04	54	04	53
	07	288	17.4			56.9	322	13.1	16.2	11	32.8	13.1	54.2	Lat.		Sunset		Twilight		Moonset									
	08	303	17.6			57.8	336	48.3	16.3	11	19.7	13.1	54.2					Civil		Naut.		10				11	12	13	
	09	318	17.7			58.8	351	23.6	16.3	11	06.6	13.1	54.2																
	10	333	17.9			59.7	5	58.9	16.3	10	53.5	13.2	54.2																
	11	348	18.0			00.7	20	34.2	16.4	10	40.3	13.3	54.2																
	12	3	18.2	S	7	01.6	35	09.6	16.4	N10	27.0	13.2	54.2	N	72	16	28	17	37	18	55	18	33	17	47	17	12	16	40
	13	18	18.4			02.5	49	45.0	16.4	10	13.8	13.4	54.2	N	70	16	37	17	39	18	49	18	06	17	33	17	07	16	43
	14	33	18.5			03.5	64	20.4	16.5	10	00.4	13.3	54.2	68	16	44	17	40	18	45	17	45	17	22	17	03	16	45	
	15	48	18.7			04.4	78	55.9	16.4	9	47.1	13.4	54.2	66	16	50	17	42	18	41	17	28	17	13	17	00	16	47	
	16	63	18.9			05.4	93	31.3	16.5	9	33.7	13.5	54.2	64	16	55	17	43	18	38	17	15	17	05	16	57	16	48	
	17	78	19.0			06.3	108	06.8	16.5	9	20.2	13.5	54.2	62	17	00	17	44	18	35	17	03	16	59	16	54	16	50	
	18	93	19.2	S	7	07.3	122	42.3	16.6	N 9	06.7	13.5	54.3	60	17	04	17	45	18	33	16	53	16	53	16	52	16	51	
	19	108	19.3			08.2	137	17.9	16.6	8	53.2	13.5	54.3	N	58	17	07	17	46	18	32	16	45	16	48	16	50	16	52
	20	123	19.5			09.1	151	53.5	16.5	8	39.7	13.6	54.3	56	17	10	17	47	18	30	16	37	16	43	16	48	16	53	
	21	138	19.7			10.1	166	29.0	16.7	8	26.1	13.7	54.3	54	17	13	17	48	18	29	16	30	16	39	16	47	16	54	
	22	153	19.8			11.0	181	04.7	16.6	8	12.4	13.6	54.3	52	17	16	17	49	18	28	16	24	16	35	16	45	16	55	
	23	168	20.0			12.0	195	40.3	16.6	7	58.8	13.7	54.3	50	17	18	17	50	18	27	16	19	16	32	16	44	16	55	
	THURSDAY	00	183	20.1	S	7	12.9	210	15.9	16.7	N 7	45.1	13.8	54.3	45	17	23	17	52	18	26	16	06	16	24	16	41	16	57
01		198	20.3			13.9	224	51.6	16.7	7	31.3	13.7	54.3	N	40	17	27	17	54	18	26	15	56	16	18	16	38	16	58
02		213	20.4			14.8	239	27.3	16.7	7	17.6	13.8	54.3	35	17	31	17	56	18	25	15	48	16	13	16	36	16	59	
03		228	20.6			15.7	254	03.0	16.7	7	03.8	13.8	54.3	30	17	34	17	58	18	26	15	40	16	08	16	34	17	00	
04		243	20.8			16.7	268	38.7	16.7	6	50.0	13.9	54.3	20	17	40	18	02	18	28	15	27	16	00	16	31	17	02	
05		258	20.9			17.6	283	14.4	16.8	6	36.1	13.9	54.4	N	10	17	45	18											

UT	ARIES		VENUS −4.6		MARS +1.6		JUPITER −2.9		SATURN +0.6		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
F R I D A Y	00	21 17.9	226 25.1 N 8 57.5	172 45.9 S11 26.5	340 04.6 N14 27.6	47 40.6 S12 47.9	Acamar	315 12.2 S40 12.4					
	01	36 20.4	241 25.4 57.0	187 46.8 27.1	355 07.3 27.5	62 43.1 47.9	Achernar	335 20.4 S57 06.9					
	02	51 22.9	256 25.6 56.4	202 47.6 27.7	10 10.0 27.4	77 45.7 48.0	Acruhr	173 02.0 S63 13.7					
	03	66 25.3	271 25.8 . . 55.9	217 48.5 . . 28.4	25 12.8 . . 27.3	92 48.2 . . 48.0	Adhara	255 06.6 S28 59.9					
	04	81 27.8	286 26.1 55.4	232 49.3 29.0	40 15.5 27.3	107 50.8 48.0	Aldebaran	290 40.6 N16 33.5					
	05	96 30.2	301 26.3 54.9	247 50.2 29.6	55 18.3 27.2	122 53.3 48.0							
	06	111 32.7	316 26.5 N 8 54.3	262 51.0 S11 30.2	70 21.0 N14 27.1	137 55.9 S12 48.1	Alioth	166 14.4 N55 49.9					
	07	126 35.2	331 26.8 53.8	277 51.9 30.8	85 23.8 27.0	152 58.5 48.1	Alkaid	152 53.3 N49 11.8					
	08	141 37.6	346 27.0 53.3	292 52.7 31.4	100 26.5 26.9	168 01.0 48.1	Alnair	27 33.9 S46 50.9					
	09	156 40.1	1 27.2 . . 52.8	307 53.6 . . 32.0	115 29.3 . . 26.8	183 03.6 . . 48.2	Alnilam	275 38.6 S 1 11.0					
	10	171 42.6	16 27.4 52.2	322 54.5 32.6	130 32.0 26.7	198 06.1 48.2	Alphard	217 49.0 S 8 45.5					
	11	186 45.0	31 27.7 51.7	337 55.3 33.3	145 34.7 26.6	213 08.7 48.2							
	12	201 47.5	46 27.9 N 8 51.2	352 56.2 S11 33.9	160 37.5 N14 26.6	228 11.2 S12 48.2	Alphecca	126 04.9 N26 38.3					
	13	216 50.0	61 28.1 50.6	7 57.0 34.5	175 40.2 26.5	243 13.8 48.3	Alpheratz	357 35.5 N29 13.4					
	14	231 52.4	76 28.3 50.1	22 57.9 35.1	190 43.0 26.4	258 16.3 48.3	Altair	62 01.0 N 8 56.0					
	15	246 54.9	91 28.5 . . 49.6	37 58.7 . . 35.7	205 45.7 . . 26.3	273 18.9 . . 48.3	Ankaa	353 07.8 S42 10.6					
	16	261 57.3	106 28.8 49.0	52 59.6 36.3	220 48.5 26.2	288 21.4 48.4	Antares	112 17.4 S26 29.1					
	17	276 59.8	121 29.0 48.5	68 00.4 36.9	235 51.2 26.1	303 24.0 48.4							
	18	292 02.3	136 29.2 N 8 48.0	83 01.3 S11 37.5	250 54.0 N14 26.0	318 26.5 S12 48.4	Arcturus	145 49.2 N19 03.7					
	19	307 04.7	151 29.4 47.4	98 02.1 38.2	265 56.7 25.9	333 29.1 48.4	Atria	107 12.9 S69 04.4					
	20	322 07.2	166 29.6 46.9	113 03.0 38.8	280 59.5 25.8	348 31.6 48.5	Avior	234 15.3 S59 34.7					
	21	337 09.7	181 29.9 . . 46.3	128 03.8 . . 39.4	296 02.2 . . 25.8	3 34.2 . . 48.5	Bellatrix	278 23.8 N 6 22.4					
	22	352 12.1	196 30.1 45.8	143 04.7 40.0	311 05.0 25.7	18 36.7 48.5	Betelgeuse	270 53.1 N 7 24.8					
	23	7 14.6	211 30.3 45.3	158 05.5 40.6	326 07.7 25.6	33 39.3 48.6							
S A T U R D A Y	00	22 17.1	226 30.5 N 8 44.7	173 06.4 S11 41.2	341 10.5 N14 25.5	48 41.8 S12 48.6	Canopus	263 52.7 S52 42.1					
	01	37 19.5	241 30.7 44.2	188 07.2 41.8	356 13.2 25.4	63 44.4 48.6	Capella	280 23.2 N46 01.2					
	02	52 22.0	256 30.9 43.6	203 08.1 42.4	11 16.0 25.3	78 46.9 48.6	Deneb	49 26.4 N45 22.1					
	03	67 24.5	271 31.1 . . 43.1	218 09.0 . . 43.0	26 18.7 . . 25.2	93 49.5 . . 48.7	Denebola	182 26.3 N14 26.5					
	04	82 26.9	286 31.3 42.5	233 09.8 43.6	41 21.5 25.1	108 52.0 48.7	Diphda	348 48.0 S17 51.3					
	05	97 29.4	301 31.6 42.0	248 10.7 44.3	56 24.2 25.0	123 54.6 48.7							
	06	112 31.8	316 31.8 N 8 41.4	263 11.5 S11 44.9	71 27.0 N14 25.0	138 57.1 S12 48.8	Dubhe	193 42.8 N61 37.3					
	07	127 34.3	331 32.0 40.9	278 12.4 45.5	86 29.7 24.9	153 59.7 48.8	Elnath	278 03.0 N28 37.6					
	08	142 36.8	346 32.2 40.3	293 13.2 46.1	101 32.5 24.8	169 02.2 48.8	Eltanin	90 42.9 N51 29.4					
	09	157 39.2	1 32.4 . . 39.8	308 14.1 . . 46.7	116 35.2 . . 24.7	184 04.8 . . 48.8	Enif	33 39.7 N 9 59.1					
	10	172 41.7	16 32.6 39.2	323 14.9 47.3	131 38.0 24.6	199 07.3 48.9	Fomalhaut	15 15.4 S29 29.8					
	11	187 44.2	31 32.8 38.7	338 15.8 47.9	146 40.7 24.5	214 09.9 48.9							
	12	202 46.6	46 33.0 N 8 38.1	353 16.6 S11 48.5	161 43.5 N14 24.4	229 12.4 S12 48.9	Gacrux	171 53.4 S57 14.6					
	13	217 49.1	61 33.2 37.6	8 17.4 49.1	176 46.2 24.3	244 15.0 48.9	Gienah	175 45.0 S17 40.2					
	14	232 51.6	76 33.4 37.0	23 18.3 49.7	191 49.0 24.2	259 17.5 49.0	Hadar	148 38.2 S60 29.2					
	15	247 54.0	91 33.6 . . 36.5	38 19.1 . . 50.4	206 51.7 . . 24.1	274 20.1 . . 49.0	Hamal	327 52.1 N23 34.6					
	16	262 56.5	106 33.8 35.9	53 20.0 51.0	221 54.5 24.1	289 22.6 49.0	Kaus Aust.	83 34.0 S34 22.5					
	17	277 59.0	121 34.0 35.4	68 20.8 51.6	236 57.2 24.0	304 25.1 49.1							
	18	293 01.4	136 34.2 N 8 34.8	83 21.7 S11 52.2	252 00.0 N14 23.9	319 27.7 S12 49.1	Kochab	137 20.8 N74 03.6					
	19	308 03.9	151 34.4 34.3	98 22.5 52.8	267 02.7 23.8	334 30.2 49.1	Markab	13 30.7 N15 20.1					
	20	323 06.3	166 34.6 33.7	113 23.4 53.4	282 05.5 23.7	349 32.8 49.1	Menkar	314 07.0 N 4 11.1					
	21	338 08.8	181 34.8 . . 33.1	128 24.2 . . 54.0	297 08.2 . . 23.6	4 35.3 . . 49.2	Menkent	147 59.3 S36 29.1					
	22	353 11.3	196 35.0 32.6	143 25.1 54.6	312 11.0 23.5	19 37.9 49.2	Miaplacidus	221 38.9 S69 48.5					
	23	8 13.7	211 35.2 32.0	158 25.9 55.2	327 13.7 23.4	34 40.4 49.2							
S U N D A Y	00	23 16.2	226 35.4 N 8 31.5	173 26.8 S11 55.8	342 16.5 N14 23.3	49 43.0 S12 49.2	Mirfak	308 29.3 N49 56.7					
	01	38 18.7	241 35.6 30.9	188 27.6 56.4	357 19.2 23.2	64 45.5 49.3	Nunki	75 49.1 S26 16.1					
	02	53 21.1	256 35.8 30.3	203 28.5 57.0	12 22.0 23.2	79 48.1 49.3	Peacock	53 07.2 S56 39.7					
	03	68 23.6	271 36.0 . . 29.8	218 29.3 . . 57.7	27 24.8 . . 23.1	94 50.6 . . 49.3	Pollux	243 18.6 N27 58.1					
	04	83 26.1	286 36.2 29.2	233 30.2 58.3	42 27.5 23.0	109 53.2 49.4	Procyon	244 51.9 N 5 10.0					
	05	98 28.5	301 36.3 28.6	248 31.0 58.9	57 30.3 22.9	124 55.7 49.4							
	06	113 31.0	316 36.5 N 8 28.1	263 31.9 S11 59.5	72 33.0 N14 22.8	139 58.2 S12 49.4	Rasalhague	95 59.7 N12 32.7					
	07	128 33.4	331 36.7 27.5	278 32.7 12 00.1	87 35.8 22.7	155 00.8 49.4	Regulus	207 35.8 N11 51.2					
	08	143 35.9	346 36.9 26.9	293 33.5 00.7	102 38.5 22.6	170 03.3 49.5	Rigel	281 04.7 S 8 10.3					
	09	158 38.4	1 37.1 . . 26.4	308 34.4 . . 01.3	117 41.3 . . 22.5	185 05.9 . . 49.5	Rigel Kent.	139 42.4 S60 56.0					
	10	173 40.8	16 37.3 25.8	323 35.2 01.9	132 44.0 22.4	200 08.4 49.5	Sabik	102 04.2 S15 45.2					
	11	188 43.3	31 37.5 25.2	338 36.1 02.5	147 46.8 22.3	215 11.0 49.5							
	12	203 45.8	46 37.7 N 8 24.7	353 36.9 S12 03.1	162 49.5 N14 22.3	230 13.5 S12 49.6	Schedar	349 31.7 N56 40.1					
	13	218 48.2	61 37.8 24.1	8 37.8 03.7	177 52.3 22.2	245 16.1 49.6	Shaula	96 12.0 S37 07.3					
	14	233 50.7	76 38.0 23.5	23 38.6 04.3	192 55.1 22.1	260 18.6 49.6	Sirius	258 27.1 S16 44.7					
	15	248 53.2	91 38.2 . . 22.9	38 39.5 . . 04.9	207 57.8 . . 22.0	275 21.1 . . 49.6	Spica	158 23.7 S11 17.0					
	16	263 55.6	106 38.4 22.4	53 40.3 05.5	223 00.6 21.9	290 23.7 49.7	Suhail	222 47.3 S43 31.3					
	17	278 58.1	121 38.6 21.8	68 41.1 06.1	238 03.3 21.8	305 26.2 49.7							
	18	294 00.6	136 38.8 N 8 21.2	83 42.0 S12 06.7	253 06.1 N14 21.7	320 28.8 S12 49.7	Vega	80 34.0 N38 48.6					
	19	309 03.0	151 38.9 20.6	98 42.8 07.4	268 08.8 21.6	335 31.3 49.7	Zuben'ubi	136 57.5 S16 08.3					
	20	324 05.5	166 39.1 20.1	113 43.7 08.0	283 11.6 21.5	350 33.9 49.8							
	21	339 07.9	181 39.3 . . 19.5	128 44.5 . . 08.6	298 14.4 . . 21.4	5 36.4 . . 49.8							
	22	354 10.4	196 39.5 18.9	143 45.3 09.2	313 17.1 21.3	20 39.0 49.8	Venus	204 13.4 8 54					
	23	9 12.9	211 39.6 18.3	158 46.2 09.8	328 19.9 21.2	35 41.5 49.8	Mars	150 49.3 12 27					
		h m											
Mer. Pass. 22		27.2	v 0.2 d 0.6	v 0.8 d 0.6	v 2.8 d 0.1	v 2.5 d 0.0							

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise																	
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	13		14	15	16															
d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m													
13 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	F R I D A Y	183	23.9	S	7	35.4	200	34.6	16.8	N	2	07.9	14.3	54.6	N	72	04	49	06	08	07	18	04	33	06	34	08	47	12	04
		198	24.0			36.4	215	10.4	16.8	1	53.6	14.4	54.6	68	04	57	06	02	06	59	04	36	06	20	08	10	10	17		
		213	24.2			37.3	229	46.2	16.7	1	39.2	14.3	54.6	66	05	00	06	00	06	52	04	37	06	15	07	57	09	51		
		228	24.3			38.3	244	21.9	16.8	1	24.9	14.4	54.6	64	05	02	05	57	06	46	04	38	06	10	07	47	09	31		
		243	24.5			39.2	258	57.7	16.8	1	10.5	14.3	54.6	62	05	04	05	56	06	41	04	38	06	06	07	38	09	16		
		258	24.6			40.1	273	33.5	16.7	0	56.2	14.4	54.6	60	05	06	05	54	06	36	04	39	06	03	07	30	09	02		
		273	24.8	S	7	41.1	288	09.2	16.8	N	0	41.8	14.4	54.7	N	58	05	07	05	52	06	32	04	39	06	00	07	23	08	51
		288	24.9			42.0	302	45.0	16.7	0	27.4	14.4	54.7	56	05	08	05	51	06	28	04	40	05	57	07	18	08	41		
		303	25.1			42.9	317	20.7	16.7	N	0	13.0	14.4	54.7	54	05	09	05	50	06	25	04	40	05	55	07	12	08	33	
		318	25.2			43.9	331	56.4	16.7	S	0	01.4	14.5	54.7	52	05	09	05	48	06	22	04	41	05	53	07	08	08	25	
		333	25.4			44.8	346	32.1	16.7	0	15.9	14.4	54.7	50	05	10	05	47	06	20	04	41	05	51	07	03	08	18	19	
		348	25.5			45.7	1	07.8	16.7	0	30.3	14.4	54.7	45	05	10	05	44	06	14	04	42	05	47	06	54	08	04		
		3	25.7	S	7	46.7	15	43.5	16.6	S	0	44.7	14.5	54.7	N	40	05	10	05	42	06	09	04	42	05	44	06	46	07	52
		18	25.8			47.6	30	19.1	16.6	0	59.2	14.4	54.8	35	05	10	05	39	06	05	04	43	05	41	06	40	07	42		
		33	26.0			48.5	44	54.7	16.6	1	13.6	14.4	54.8	30	05	09	05	37	06	01	04	43	05	38	06	34	07	33		
		48	26.1			49.5	59	30.3	16.6	1	28.0	14.5	54.8	20	05	07	05	32	05	54	04	44	05	34	06	24	07	18		
		63	26.3			50.4	74	05.9	16.6	1	42.5	14.5	54.8	N	10	05	03	05	27	05	48	04	45	05	30	06	16	07	05	
		78	26.4			51.3	88	41.5	16.5	1	57.0	14.4	54.8	0	04	58	05	22	05	43	04	46	05	26	06	08	06	52		
		93	26.6	S	7	52.3	103	17.0	16.5	S	2	11.4	14.5	54.8	S	10	04	51	05	16	05	37	04	46	05	22	06	00	06	40
		108	26.7			53.2	117	52.5	16.5	2	25.9	14.4	54.8	20	04	42	05	08	05	31	04	47	05	19	05	52	06	27		
		123	26.9			54.1	132	28.0	16.5	2	40.3	14.5	54.9	30	04	31	04	59	05	23	04	48	05	14	05	42	06	13		
		138	27.0			55.1	147	03.5	16.4	2	54.8	14.4	54.9	35	04	23	04	53	05	19	04	49	05	12	05	37	06	04		
		153	27.2			56.0	161	38.9	16.4	3	09.2	14.5	54.9	40	04	14	04	47	05	14	04	49	05	09	05	31	05	55		
		168	27.3			56.9	176	14.3	16.4	3	23.7	14.4	54.9	45	04	02	04	39	05	09	04	50	05	06	05	24	05	44		
		183	27.5	S	7	57.9	190	49.7	16.3	S	3	38.1	14.5	54.9	S	50	03	48	04	28	05	02	04	51	05	02	05	15	05	30
198	27.6			58.8	205	25.0	16.3	3	52.6	14.4	54.9	52	03	40	04	24	04	59	04	51	05	01	05	11	05	24				
213	27.8			59.7	220	00.3	16.3	4	07.0	14.4	55.0	54	03	32	04	18	04	55	04	52	04	59	05	07	05	17				
228	27.9			8 00.7	234	35.6	16.3	4	21.4	14.4	55.0	56	03	23	04	12	04	52	04	52	04	57	05	02	05	10				
243	28.1			01.6	249	10.9	16.2	4	35.8	14.5	55.0	58	03	12	04	06	04	47	04	52	04	55	04	57	05	01				
258	28.2			02.5	263	46.1	16.1	4	50.3	14.4	55.0	S	60	03	00	03	58	04	43	04	53	04	52	04	51	04	51			
273	28.4	S	8	03.5	278	21.2	16.2	S	5	04.7	14.4	55.0	Lat.		Sunset		Twilight		Moonset											
288	28.5			04.4	292	56.4	16.1	5	19.1	14.3	55.0					Civil		Naut.		13		14		15		16				
303	28.7			05.3	307	31.5	16.0	5	33.4	14.4	55.1																			
318	28.8			06.3	322	06.5	16.0	5	47.8	14.4	55.1																			
333	28.9			07.2	336	41.5	16.0	6	02.2	14.3	55.1																			
348	29.1			08.1	351	16.5	15.9	6	16.5	14.3	55.1	N	72	16	12	17	22	18	40	16	40	16	07	15	23	13	40			
3	29.2	S	8	09.0	5	51.4	15.9	S	6	30.8	14.3	55.1	N	70	16	23	17	26	18	36	16	43	16	17	15	46	14	53		
18	29.4			10.0	20	26.3	15.9	6	45.1	14.3	55.1	68	16	32	17	29	18	33	16	45	16	26	16	04	15	31				
33	29.5			10.9	35	01.2	15.8	6	59.4	14.3	55.2	66	16	39	17	31	18	30	16	47	16	33	16	18	15	58				
48	29.7			11.8	49	36.0	15.7	7	13.7	14.3	55.2	64	16	45	17	33	18	28	16	48	16	40	16	30	16	18				
63	29.8			12.8	64	10.7	15.7	7	28.0	14.2	55.2	62	16	50	17	35	18	26	16	50	16	45	16	40	16	35				
78	30.0			13.7	78	45.4	15.7	S	7	42.2	14.2	55.2	60	16	55	17	37	18	25	16	51	16	50	16	49	16	49			
93	30.1	S	8	14.6	An annular eclipse of the Sun occurs on this date. See page 5.						N	58	16	59	17	39	18	24	16	52	16	54	16	57	17	02				
108	30.2			15.5							56	17	03	17	40	18	23	16	53	16	58	17	04	17	12					
123	30.4			16.5							54	17	06	17	42	18	22	16	54	17	01	17	10	17	22					
138	30.5			17.4							52	17	09	17	43	18	22	16	55	17	04	17	16	17	30					
153	30.7			18.3							50	17	12	17	44	18	21	16	55	17	07	17	21	17	37					
168	30.8			19.3							45	17	18	17	47	18	21	16	57	17	13	17	32	17	54					
183	31.0	S	8	20.2	180	47.0	15.3	S	9	21.2	14.1	55.3	N	40	17	23	17	50	18	21	16	58	17	19	17	41	18	07		
198	31.1			21.1	195	21.3	15.2	9	35.3	14.0	55.4	35	17	27	17	52	18	22	16	59	17	23	17	49	18	18				
213	31.2			22.0	209	55.5	15.2	9	49.3	14.0	55.4	30	17	31	17	55	18	23	17	00	17	27	17	56	18	28				
228	31.4			23.0	224	29.7	15.1	10	03.3	13.9	55.4	20	17	38	18	00	18	25	17	02	17	34	18	08	18	46				
243	31.5			23.9	239	03.8	15.0	10	17.2	14.0	55.4	N	10	17	44	18	05	18	29	17	04	17	40	18	19	19	01			
258	31.7			24.8	253	37.8	15.0	10	31.2	13.9	55.4	0	17	49	18	10	18	35	17	05	17	46	18	29	19	15				
273	31.8	S	8	25.7	268	11.8	14.9	S10	45.1	13.8	55.4	S	10	17	55	18	17	18	41	17	06	17	52	18	39	19	29			
288	32.0			26.7	282	45.7	14.9	10	58.9	13.8	55.5	20	18	02	18	24	18	50	17	08	17	58	18	50	19	44				
303	32.1			27.6	297	19.6	14.8	11	12.7	13.8	55.5	30	18	09	18	33	19	02	17	10	18	05	19	02	20	02				
318	32																													

2023 OCTOBER 16, 17, 18 (MON., TUES., WED.)																							
UT		ARIES		VENUS -4.5			MARS +1.6			JUPITER -2.9			SATURN +0.6			STARS							
		GHA		GHA		Dec	GHA		Dec		GHA		Dec		GHA		Dec		Name		SHA		Dec
d h		° ' "		° ' "		° ' "	° ' "		° ' "		° ' "		° ' "		° ' "		° ' "				° ' "		° ' "
MONDAY	16 00	24	15.3	226	39.8	N 8 17.7	173	47.0	S12 10.4	343	22.6	N14 21.2	50	44.0	S12 49.9	Acamar	315	12.2	S40 12.4				
	01	39	17.8	241	40.0	17.1	188	47.9	11.0	358	25.4	21.1	65	46.6	49.9	Achernar	335	20.4	S57 06.9				
	02	54	20.3	256	40.2	16.6	203	48.7	11.6	13	28.1	21.0	80	49.1	49.9	Acrux	173	01.9	S63 13.7				
	03	69	22.7	271	40.3	16.0	218	49.6	12.2	28	30.9	20.9	95	51.7	49.9	Adhara	255	06.6	S28 59.9				
	04	84	25.2	286	40.5	15.4	233	50.4	12.8	43	33.7	20.8	110	54.2	50.0	Aldebaran	290	40.6	N16 33.5				
	05	99	27.7	301	40.7	14.8	248	51.2	13.4	58	36.4	20.7	125	56.7	50.0								
	06	114	30.1	316	40.9	N 8 14.2	263	52.1	S12 14.0	73	39.2	N14 20.6	140	59.3	S12 50.0	Alioth	166	14.4	N55 49.9				
	07	129	32.6	331	41.0	13.6	278	52.9	14.6	88	41.9	20.5	156	01.8	50.0	Alkaid	152	53.3	N49 11.8				
	08	144	35.0	346	41.2	13.1	293	53.8	15.2	103	44.7	20.4	171	04.4	50.1	Alnair	27	33.9	S46 50.9				
	09	159	37.5	1	41.4	12.5	308	54.6	15.8	118	47.5	20.3	186	06.9	50.1	Alnilam	275	38.6	S 1 11.0				
	10	174	40.0	16	41.5	11.9	323	55.4	16.4	133	50.2	20.2	201	09.5	50.1	Alphard	217	48.9	S 8 45.5				
	11	189	42.4	31	41.7	11.3	338	56.3	17.0	148	53.0	20.1	216	12.0	50.1								
	12	204	44.9	46	41.9	N 8 10.7	353	57.1	S12 17.6	163	55.7	N14 20.1	231	14.5	S12 50.2	Alphecca	126	04.9	N26 38.2				
	13	219	47.4	61	42.0	10.1	8	58.0	18.2	178	58.5	20.0	246	17.1	50.2	Alpheratz	357	35.5	N29 13.4				
	14	234	49.8	76	42.2	09.5	23	58.8	18.8	194	01.3	19.9	261	19.6	50.2	Altair	62	01.0	N 8 56.0				
	15	249	52.3	91	42.4	08.9	38	59.6	19.4	209	04.0	19.8	276	22.2	50.2	Ankaa	353	07.8	S42 10.6				
	16	264	54.8	106	42.5	08.3	54	00.5	20.0	224	06.8	19.7	291	24.7	50.3	Antares	112	17.4	S26 29.1				
	17	279	57.2	121	42.7	07.7	69	01.3	20.6	239	09.5	19.6	306	27.2	50.3								
	18	294	59.7	136	42.9	N 8 07.1	84	02.2	S12 21.2	254	12.3	N14 19.5	321	29.8	S12 50.3	Arcturus	145	49.2	N19 03.7				
	19	310	02.2	151	43.0	06.5	99	03.0	21.8	269	15.1	19.4	336	32.3	50.3	Atria	107	12.9	S69 04.4				
	20	325	04.6	166	43.2	05.9	114	03.8	22.4	284	17.8	19.3	351	34.9	50.4	Avior	234	15.3	S59 34.7				
	21	340	07.1	181	43.3	05.3	129	04.7	23.0	299	20.6	19.2	6	37.4	50.4	Bellatrix	278	23.8	N 6 22.4				
	22	355	09.5	196	43.5	04.7	144	05.5	23.6	314	23.3	19.1	21	39.9	50.4	Betelgeuse	270	53.1	N 7 24.8				
	23	10	12.0	211	43.7	04.1	159	06.3	24.2	329	26.1	19.0	36	42.5	50.4								
TUESDAY	17 00	25	14.5	226	43.8	N 8 03.5	174	07.2	S12 24.8	344	28.9	N14 18.9	51	45.0	S12 50.5	Canopus	263	52.7	S52 42.1				
	01	40	16.9	241	44.0	02.9	189	08.0	25.5	359	31.6	18.9	66	47.6	50.5	Capella	280	23.2	N46 01.2				
	02	55	19.4	256	44.1	02.3	204	08.8	26.1	14	34.4	18.8	81	50.1	50.5	Deneb	49	26.4	N45 22.1				
	03	70	21.9	271	44.3	01.7	219	09.7	26.7	29	37.2	18.7	96	52.6	50.5	Denebola	182	26.3	N14 26.5				
	04	85	24.3	286	44.5	01.1	234	10.5	27.3	44	39.9	18.6	111	55.2	50.6	Diphda	348	48.0	S17 51.3				
	05	100	26.8	301	44.6	8 00.5	249	11.4	27.9	59	42.7	18.5	126	57.7	50.6								
	06	115	29.3	316	44.8	N 7 59.9	264	12.2	S12 28.5	74	45.4	N14 18.4	142	00.2	S12 50.6	Dubhe	193	42.8	N61 37.3				
	07	130	31.7	331	44.9	59.3	279	13.0	29.1	89	48.2	18.3	157	02.8	50.6	El Nath	278	03.0	N28 37.6				
	08	145	34.2	346	45.1	58.7	294	13.9	29.7	104	51.0	18.2	172	05.3	50.6	Eltanin	90	42.9	N51 29.4				
	09	160	36.7	1	45.2	58.1	309	14.7	30.3	119	53.7	18.1	187	07.9	50.7	Enif	33	39.7	N 9 59.1				
	10	175	39.1	16	45.4	57.5	324	15.5	30.9	134	56.5	18.0	202	10.4	50.7	Fomalhaut	15	15.4	S29 29.8				
	11	190	41.6	31	45.5	56.9	339	16.4	31.5	149	59.3	17.9	217	12.9	50.7								
	12	205	44.0	46	45.7	N 7 56.3	354	17.2	S12 32.1	165	02.0	N14 17.8	232	15.5	S12 50.7	Gacrux	171	53.4	S57 14.6				
	13	220	46.5	61	45.8	55.7	9	18.0	32.7	180	04.8	17.7	247	18.0	50.8	Gienah	175	45.0	S17 40.2				
	14	235	49.0	76	46.0	55.1	24	18.9	33.3	195	07.6	17.6	262	20.5	50.8	Hadar	148	38.2	S60 29.2				
	15	250	51.4	91	46.1	54.4	39	19.7	33.9	210	10.3	17.6	277	23.1	50.8	Hamal	327	52.0	N23 34.6				
	16	265	53.9	106	46.3	53.8	54	20.5	34.5	225	13.1	17.5	292	25.6	50.8	Kaus Aust.	83	34.0	S34 22.5				
	17	280	56.4	121	46.4	53.2	69	21.4	35.1	240	15.9	17.4	307	28.1	50.9								
	18	295	58.8	136	46.6	N 7 52.6	84	22.2	S12 35.7	255	18.6	N14 17.3	322	30.7	S12 50.9	Kochab	137	20.8	N74 03.6				
	19	311	01.3	151	46.7	52.0	99	23.0	36.3	270	21.4	17.2	337	33.2	50.9	Markab	13	30.7	N15 20.1				
	20	326	03.8	166	46.9	51.4	114	23.9	36.9	285	24.1	17.1	352	35.8	50.9	Menkar	314	06.9	N 4 11.1				
	21	341	06.2	181	47.0	50.8	129	24.7	37.5	300	26.9	17.0	7	38.3	50.9	Menkent	147	59.3	S36 29.1				
	22	356	08.7	196	47.1	50.1	144	25.5	38.0	315	29.7	16.9	22	40.8	51.0	Miaplacidus	221	38.9	S69 48.5				
	23	11	11.1	211	47.3	49.5	159	26.4	38.6	330	32.4	16.8	37	43.4	51.0								
WEDNESDAY	18 00	26	13.6	226	47.4	N 7 48.9	174	27.2	S12 39.2	345	35.2	N14 16.7	52	45.9	S12 51.0	Mirfak	308	29.3	N49 56.7				
	01	41	16.1	241	47.6	48.3	189	28.0	39.8	0	38.0	16.6	67	48.4	51.0	Nunki	75	49.1	S26 16.1				
	02	56	18.5	256	47.7	47.7	204	28.9	40.4	15	40.7	16.5	82	51.0	51.1	Peacock	53	07.3	S56 39.7				
	03	71	21.0	271	47.8	47.0	219	29.7	41.0	30	43.5	16.4	97	53.5	51.1	Pollux	243	18.6	N27 58.1				
	04	86	23.5	286	48.0	46.4	234	30.5	41.6	45	46.3	16.3	112	56.0	51.1	Procyon	244	51.9	N 5 10.0				
	05	101	25.9	301	48.1	45.8	249	31.4	42.2	60	49.0	16.2	127	58.6	51.1								
	06	116	28.4	316	48.3	N 7 45.2	264	32.2	S12 42.8	75	51.8	N14 16.1	143	01.1	S12 51.1	Rasalhague	95	59.7	N12 32.7				
	07	131	30.9	331	48.4	44.5	279	33.0	43.4	90	54.6	16.1	158	03.6	51.2	Regulus	207	35.8	N11 51.2				
	08	146	33.3	346	48.5	43.9	294	33.8	44.0	105	57.3	16.0	173	06.2	51.2	Rigel	281	04.7	S 8 10.3				
	09	161	35.8	1	48.7	43.3	309	34.7	44.6	121	00.1	15.9	188	08.7	51.2	Rigel Kent.	139	42.4	S60 55.9				
	10	176	38.3	16	48.8	42.7	324	35.5	45.2	136	02.9	15.8	203	11.2	51.2	Sabik	102	04.2	S15 45.2				
	11	191	40.7	31	48.9	42.0	339	36.3	45.8	151	05.6	15.7	218	13.8	51.2								
	12	206	43.2	46	49.1	N 7 41.4	354	37.2	S12 46.4	166	08.4	N14 15.6	233	16.3	S12 51.3	Schedar	349	31.7	N56 40.2				
	13	221	45.6	61	49.2	40.8	9	38.0	47.0	181	11.2	15.5	248	18.8	51.3	Shaula	96	12.0	S37 07.3				
	14	236	48.1	76	49.3	40.1	24	38.8	47.6	196	14.0	15.4	263	21.4	51.3	Sirius	258	27.1	S16 44.7				
	15	251	50.6	91	49.5	39.5	39	39.6	48.2	211	16.7	15.3	278	23.9	51.3	Spica	158	23.7	S11 17.0				
	16	266	53.0	106	49.6	38.9	54	40.5	48.8	226	19.5												

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	h m	h m	h m	h m	h m	h m
MONDAY	d h	° / ' "	° / ' "		° / ' "	° / ' "		N 72	05 03	06 21	07 32	12 04				
	16 00	183 34.3 S 8	42.4		170 12.1 13.7	S14 48.1 13.0	55.8	N 70	05 06	06 16	07 20	10 53				
	01	198 34.4	43.3		184 44.8 13.5	15 01.1 13.0	55.8	68	05 08	06 12	07 10	10 17				
	02	213 34.6	44.2		199 17.3 13.5	15 14.1 12.9	55.8	66	05 10	06 09	07 02	09 51				
	03	228 34.7	45.2		213 49.8 13.4	15 27.0 12.9	55.8	64	05 11	06 06	06 55	09 31				
	04	243 34.8	46.1		228 22.2 13.4	15 39.9 12.8	55.9	62	05 12	06 03	06 49	09 16				15 35
	05	258 35.0	47.0		242 54.6 13.2	15 52.7 12.8	55.9	60	05 13	06 01	06 43	09 02				14 05
	06	273 35.1 S 8	47.9		257 26.8 13.1	S16 05.5 12.6	55.9	N 58	05 13	05 59	06 39	08 51				13 29
	07	288 35.3	48.8		271 58.9 13.1	16 18.1 12.7	55.9	56	05 14	05 57	06 35	08 41				13 03
	08	303 35.4	49.8		286 31.0 13.0	16 30.8 12.5	55.9	54	05 14	05 55	06 31	08 33				12 42
	09	318 35.5	50.7		301 03.0 12.9	16 43.3 12.5	56.0	52	05 14	05 53	06 28	08 25				12 25
	10	333 35.7	51.6		315 34.9 12.8	16 55.8 12.4	56.0	50	05 14	05 52	06 24	08 18				12 10
	11	348 35.8	52.5		330 06.7 12.7	17 08.2 12.4	56.0	45	05 14	05 48	06 18	08 04				11 41
	12	3 35.9 S 8	53.4		344 38.4 12.7	S17 20.6 12.3	56.0	N 40	05 13	05 45	06 12	07 52				11 17
	13	18 36.1	54.4		359 10.1 12.5	17 32.9 12.2	56.0	35	05 12	05 42	06 07	07 42				10 58
	14	33 36.2	55.3		13 41.6 12.5	17 45.1 12.1	56.1	30	05 11	05 39	06 03	07 33				10 42
	15	48 36.3	56.2		28 13.1 12.3	17 57.2 12.1	56.1	20	05 07	05 33	05 55	07 18				10 14
	16	63 36.5	57.1		42 44.4 12.3	18 09.3 12.0	56.1	N 10	05 03	05 27	05 49	07 05				09 51
	17	78 36.6	58.0		57 15.7 12.2	18 21.3 11.9	56.1	0	04 57	05 21	05 42	06 52				09 29
	18	93 36.7 S 8	59.0		71 46.9 12.0	S18 33.2 11.8	56.1	S 10	04 49	05 14	05 36	06 40				09 07
	19	108 36.8	59.9		86 17.9 12.0	18 45.0 11.8	56.2	20	04 40	05 06	05 28	06 27				08 43
	20	123 37.0	00.8		100 48.9 11.9	18 56.8 11.6	56.2	30	04 27	04 56	05 20	06 13				08 16
	21	138 37.1	01.7		115 19.8 11.8	19 08.4 11.6	56.2	35	04 19	04 49	05 15	06 04				08 00
	22	153 37.2	02.6		129 50.6 11.7	19 20.0 11.5	56.2	40	04 09	04 42	05 10	05 55				07 42
	23	168 37.4	03.6		144 21.3 11.7	19 31.5 11.4	56.2	45	03 56	04 33	05 04	05 44				07 20
TUESDAY	17 00	183 37.5 S 9	04.5		158 52.0 11.5	S19 42.9 11.4	56.3	S 50	03 40	04 22	04 56	05 30				06 51
	01	198 37.6	05.4		173 22.5 11.4	19 54.3 11.2	56.3	52	03 33	04 17	04 52	05 24				06 38
	02	213 37.8	06.3		187 52.9 11.3	20 05.5 11.2	56.3	54	03 24	04 11	04 48	05 17				06 22
	03	228 37.9	07.2		202 23.2 11.2	20 16.7 11.0	56.3	56	03 14	04 04	04 44	05 10				06 03
	04	243 38.0	08.1		216 53.4 11.1	20 27.7 11.0	56.3	58	03 02	03 57	04 39	05 01				05 40
	05	258 38.2	09.1		231 23.5 11.1	20 38.7 10.9	56.4	S 60	02 48	03 48	04 34	04 51				05 10
	06	273 38.3 S 9	10.0		245 53.6 10.9	S20 49.6 10.8	56.4	Lat.	Sunset	Twilight		Moonset				
	07	288 38.4	10.9		260 23.5 10.8	21 00.4 10.7	56.4			Civil	Naut.	16	17	18	19	
	08	303 38.5	11.8		274 53.3 10.7	21 11.1 10.5	56.4	°	h m	h m	h m	h m	h m	h m	h m	h m
	09	318 38.7	12.7		289 23.0 10.7	21 21.6 10.5	56.4									
	10	333 38.8	13.6		303 52.7 10.5	21 32.1 10.4	56.5	N 72	15 57	17 08	18 26	13 40				
	11	348 38.9	14.5		318 22.2 10.4	21 42.5 10.3	56.5	N 70	16 09	17 13	18 23	14 53				
	12	3 39.0 S 9	15.5		332 51.6 10.3	S21 52.8 10.2	56.5	68	16 19	17 17	18 21	15 31				
	13	18 39.2	16.4		347 20.9 10.3	22 03.0 10.1	56.5	66	16 28	17 20	18 19	15 58				
	14	33 39.3	17.3		1 50.2 10.1	22 13.1 9.9	56.5	64	16 35	17 23	18 18	16 18				
	15	48 39.4	18.2		16 19.3 10.0	22 23.0 9.9	56.6	62	16 41	17 26	18 17	16 35				15 46
	16	63 39.6	19.1		30 48.3 9.9	22 32.9 9.8	56.6	60	16 46	17 29	18 17	16 49				17 16
	17	78 39.7	20.0		45 17.2 9.9	22 42.7 9.6	56.6	N 58	16 51	17 31	18 16	17 02				17 53
	18	93 39.8 S 9	20.9		59 46.1 9.7	S22 52.3 9.5	56.6	56	16 55	17 33	18 16	17 12				18 19
	19	108 39.9	21.9		74 14.8 9.6	23 01.8 9.5	56.6	54	16 59	17 35	18 16	17 22				18 40
	20	123 40.1	22.8		88 43.4 9.5	23 11.3 9.3	56.7	52	17 02	17 37	18 16	17 30				18 57
	21	138 40.2	23.7		103 11.9 9.4	23 20.6 9.2	56.7	50	17 06	17 38	18 16	17 37				19 12
	22	153 40.3	24.6		117 40.3 9.3	23 29.8 9.0	56.7	45	17 12	17 42	18 16	17 54				19 42
	23	168 40.4	25.5		132 08.6 9.2	23 38.8 9.0	56.7	N 40	17 18	17 45	18 17	18 07				20 06
	WEDNESDAY	18 00	183 40.6 S 9	26.4		146 36.8 9.1	S23 47.8 8.8	56.8	35	17 23	17 49	18 18	18 18			
01		198 40.7	27.3		161 04.9 9.1	23 56.6 8.7	56.8	30	17 27	17 52	18 19	18 28				20 42
02		213 40.8	28.2		175 33.0 8.9	24 05.3 8.6	56.8	20	17 35	17 57	18 23	18 46				21 10
03		228 40.9	29.1		190 00.9 8.8	24 13.9 8.5	56.8	N 10	17 42	18 03	18 28	19 01				21 34
04		243 41.1	30.1		204 28.7 8.7	24 22.4 8.3	56.8	0	17 49	18 10	18 34	19 15				21 57
05		258 41.2	31.0		218 56.4 8.6	24 30.7 8.2	56.9	S 10	17 55	18 17	18 42	19 29				22 19
06		273 41.3 S 9	31.9		233 24.0 8.5	S24 38.9 8.1	56.9	20	18 03	18 25	18 51	19 44				22 44
07		288 41.4	32.8		247 51.5 8.4	24 47.0 7.9	56.9	30	18 11	18 36	19 04	20 02				23 12
08		303 41.5	33.7		262 18.9 8.3	24 54.9 7.9	56.9	35	18 16	18 42	19 13	20 12				23 28
09		318 41.7	34.6		276 46.2 8.3	25 02.8 7.6	56.9	40	18 22	18 50	19 23	20 24				23 48
10		333 41.8	35.5		291 13.5 8.1	25 10.4 7.6	57.0	45	18 28	18 59	19 36	20 38				24 11
11		348 41.9	36.4		305 40.6 8.0	25 18.0 7.4	57.0	S 50	18 36	19 10	19 52	20 55				24 42
12		3 42.0 S 9	37.3		320 07.6 7.9	S25 25.4 7.3	57.0	52	18 40	19 15	20 00	21 03				25 57
13		18 42.2	38.2		334 34.5 7.9	25 32.7 7.1	57.0	54	18 44	19 21	20 09	21 13				00 00
14		33 42.3	39.2		349 01.4 7.7	25 39.8 7.0	57.0	56	18 48	19 28	20 19	21 23				00 19
15		48 42.4	40.1		3 28.1 7.7	25 46.8 6.9	57.1	58	18 53	19 36	20 31	21 35				00 42
16		63 42.5	41.0		17 54.8 7.5	25 53.7 6.7	57.1	S 60	18 59	19 45	20 46	21 48				01 11
17		78 42.6	41.9		32 21.3 7.5	26 00.4 6.6	57.1	Day	Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
18		93 42.8 S 9	42.8		46 47.8 7.3	S26 07.0 6.4	57.1				Pass.	Upper			Lower	
19		108 42.9	43.7		61 14.1 7.3	26 13.4 6.3	57.2	d	m s	m s	h m	h m	h m	d	%	
20		123 43.0	44.6		75 40.4 7.2	26 19.7 6.1	57.2	16	14 17	14 23	11 46	13 03	00 40	02 3		
21		138 43.1	45.5		90 06.6 7.1	26 25.8 6.0	57.2	17	14 30	14 36	11 45	13 52				

UT	ARIES	VENUS	-4.5	MARS	+1.5	JUPITER	-2.9	SATURN	+0.6	STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
1900	27 12.8	226 50.6	N 7 33.8	174 47.1	S12 53.6	346 41.6	N14 14.4	53 46.7	S12 51.5	Acamar	315 12.1	S40 12.4
	42 15.2	241 50.8		189 47.9	54.2	1 44.4	14.3	68 49.2	51.5	Achernar	335 20.3	S57 06.9
	57 17.7	256 50.9	32.5	204 48.8	54.8	16 47.2	14.3	83 51.8	51.6	Acruz	173 01.9	S63 13.6
	72 20.1	271 51.0	31.9	219 49.6	55.3	31 50.0	14.2	98 54.3	51.6	Adhara	255 06.6	S28 59.9
	87 22.6	286 51.1	31.3	234 50.4	55.9	46 52.7	14.1	113 56.8	51.6	Aldebaran	290 40.6	N16 33.5
05	102 25.1	301 51.3	30.6	249 51.2	56.5	61 55.5	14.0	128 59.3	51.6			
THURSDAY	06 117 27.5	316 51.4	N 7 30.0	264 52.1	S12 57.1	76 58.3	N14 13.9	144 01.9	S12 51.6	Alioth	166 14.4	N55 49.9
	07 132 30.0	331 51.5	29.3	279 52.9	57.7	92 01.0	13.8	159 04.4	51.7	Alkaid	152 53.3	N49 11.8
	08 147 32.5	346 51.6	28.7	294 53.7	58.3	107 03.8	13.7	174 06.9	51.7	Alnair	27 33.9	S46 50.0
	09 162 34.9	1 51.7	28.0	309 54.5	58.9	122 06.6	13.6	189 09.5	51.7	Alnilam	275 38.6	S 1 11.1
	10 177 37.4	16 51.9	27.4	324 55.4	59.5	137 09.3	13.5	204 12.0	51.7	Alphard	217 48.9	S 8 45.5
	11 192 39.9	31 52.0	26.7	339 56.2	60.1	152 12.1	13.4	219 14.5	51.7			
	12 207 42.3	46 52.1	N 7 26.1	354 57.0	S13 00.7	167 14.9	N14 13.3	234 17.1	S12 51.8	Alphecca	126 04.9	N26 38.2
	13 222 44.8	61 52.2	25.5	9 57.8	01.3	182 17.7	13.2	249 19.6	51.8	Alpheratz	357 35.5	N29 13.4
	14 237 47.3	76 52.3	24.8	24 58.7	01.9	197 20.4	13.1	264 22.1	51.8	Altair	62 01.0	N 8 56.0
	15 252 49.7	91 52.4	24.2	39 59.5	02.5	212 23.2	13.0	279 24.6	51.8	Ankaa	353 07.8	S42 10.6
	16 267 52.2	106 52.6	23.5	55 00.3	03.1	227 26.0	12.9	294 27.2	51.8	Antares	112 17.4	S26 29.1
	17 282 54.6	121 52.7	22.9	70 01.1	03.7	242 28.8	12.8	309 29.7	51.9			
	18 297 57.1	136 52.8	N 7 22.2	85 01.9	S13 04.2	257 31.5	N14 12.7	324 32.2	S12 51.9	Arcturus	145 49.2	N19 03.7
	19 312 59.6	151 52.9	21.6	100 02.8	04.8	272 34.3	12.6	339 34.8	51.9	Atria	107 12.9	S69 04.3
	20 328 02.0	166 53.0	20.9	115 03.6	05.4	287 37.1	12.5	354 37.3	51.9	Avior	234 15.3	S59 34.7
	21 343 04.5	181 53.1	20.2	130 04.4	06.0	302 39.8	12.4	9 39.8	51.9	Bellatrix	278 23.8	N 6 22.4
	22 358 07.0	196 53.2	19.6	145 05.2	06.6	317 42.6	12.3	24 42.3	52.0	Betelgeuse	270 53.1	N 7 24.8
	23 13 09.4	211 53.4	18.9	160 06.1	07.2	332 45.4	12.2	39 44.9	52.0			
2000	28 11.9	226 53.5	N 7 18.3	175 06.9	S13 07.8	347 48.2	N14 12.2	54 47.4	S12 52.0	Canopus	263 52.7	S52 42.1
	43 14.4	241 53.6	17.6	190 07.7	08.4	2 50.9	12.1	69 49.9	52.0	Capella	280 23.1	N46 01.2
	58 16.8	256 53.7	17.0	205 08.5	09.0	17 53.7	12.0	84 52.4	52.0	Deneb	49 26.4	N45 22.1
	73 19.3	271 53.8	16.3	220 09.3	09.6	32 56.5	11.9	99 55.0	52.1	Denebola	182 26.8	N14 26.5
	88 21.8	286 53.9	15.7	235 10.2	10.2	47 59.3	11.8	114 57.5	52.1	Diphda	348 48.0	S17 51.3
04	103 24.2	301 54.0	15.0	250 11.0	10.8	63 02.0	11.7	130 00.0	52.1			
FRIDAY	06 118 26.7	316 54.1	N 7 14.3	265 11.8	S13 11.3	78 04.8	N14 11.6	145 02.6	S12 52.1	Dubhe	193 42.7	N61 37.3
	07 133 29.1	331 54.2	13.7	280 12.6	11.9	93 07.6	11.5	160 05.1	52.1	Elnath	278 03.0	N28 37.6
	08 148 31.6	346 54.3	13.0	295 13.4	12.5	108 10.4	11.4	175 07.6	52.2	Eltanin	90 42.9	N51 29.4
	09 163 34.1	1 54.4	12.3	310 14.3	13.1	123 13.1	11.3	190 10.1	52.2	Enif	33 39.7	N 9 59.9
	10 178 36.5	16 54.5	11.7	325 15.1	13.7	138 15.9	11.2	205 12.7	52.2	Fomalhaut	15 15.4	S29 29.8
	11 193 39.0	31 54.6	11.0	340 15.9	14.3	153 18.7	11.1	220 15.2	52.2			
	12 208 41.5	46 54.7	N 7 10.4	355 16.7	S13 14.9	168 21.5	N14 11.0	235 17.7	S12 52.2	Gacrux	171 53.4	S57 14.6
	13 223 43.9	61 54.8	09.7	10 17.5	15.5	183 24.2	10.9	250 20.2	52.2	Gienah	175 45.0	S17 40.2
	14 238 46.4	76 55.0	09.0	25 18.4	16.1	198 27.0	10.8	265 22.8	52.3	Hadar	148 38.2	S60 29.2
	15 253 48.9	91 55.1	08.4	40 19.2	16.6	213 29.8	10.7	280 25.3	52.3	Hamal	327 52.0	N23 34.6
	16 268 51.3	106 55.2	07.7	55 20.0	17.2	228 32.6	10.6	295 27.8	52.3	Kaus Aust.	83 34.0	S34 22.5
	17 283 53.8	121 55.3	07.0	70 20.8	17.8	243 35.3	10.5	310 30.3	52.3			
	18 298 56.2	136 55.4	N 7 06.4	85 21.6	S13 18.4	258 38.1	N14 10.4	325 32.9	S12 52.3	Kochab	137 20.9	N74 03.5
	19 313 58.7	151 55.5	05.7	100 22.4	19.0	273 40.9	10.3	340 35.4	52.4	Markab	13 30.7	N15 20.1
	20 329 01.2	166 55.6	05.0	115 23.3	19.6	288 43.7	10.2	355 37.9	52.4	Menkar	314 06.9	N 4 11.1
	21 344 03.6	181 55.6	04.3	130 24.1	20.2	303 46.4	10.1	10 40.4	52.4	Menkent	147 59.3	S36 29.1
	22 359 06.1	196 55.7	03.7	145 24.9	20.8	318 49.2	10.0	25 43.0	52.4	Miaplacidus	221 38.8	S69 48.5
	23 14 08.6	211 55.8	03.0	160 25.7	21.4	333 52.0	09.9	40 45.5	52.4			
2100	29 11.0	226 55.9	N 7 02.3	175 26.5	S13 21.9	348 54.8	N14 09.8	55 48.0	S12 52.4	Mirfak	308 29.3	N49 56.6
	44 13.5	241 56.0	01.7	190 27.4	22.5	3 57.5	09.7	70 50.5	52.5	Nunki	75 49.1	S26 16.6
	59 16.0	256 56.1	01.0	205 28.2	23.1	19 00.3	09.6	85 53.0	52.5	Peacock	53 07.3	S56 39.7
	74 18.4	271 56.2	7 00.3	220 29.0	23.7	34 03.1	9.6	100 55.6	52.5	Pollux	243 18.6	N27 58.1
	89 20.9	286 56.3	6 59.6	235 29.8	24.3	49 05.9	09.5	115 58.1	52.5	Procyon	244 51.9	N 5 10.0
05	104 23.4	301 56.4	58.9	250 30.6	24.9	64 08.7	09.4	131 00.6	52.5			
SATURDAY	06 119 25.8	316 56.5	N 6 58.3	265 31.4	S13 25.5	79 11.4	N14 09.3	146 03.1	S12 52.6	Rasalhague	95 59.7	N12 32.7
	07 134 28.3	331 56.6	57.6	280 32.2	26.1	94 14.2	09.2	161 05.7	52.6	Regulus	207 35.7	N11 51.2
	08 149 30.7	346 56.7	56.9	295 33.1	26.6	109 17.0	09.1	176 08.2	52.6	Rigel	281 04.7	S 8 10.3
	09 164 33.2	1 56.8	56.2	310 33.9	27.2	124 19.8	9.0	191 10.7	52.6	Rigil Kent.	139 42.4	S60 55.9
	10 179 35.7	16 56.9	55.6	325 34.7	27.8	139 22.5	08.9	206 13.2	52.6	Sabik	102 04.2	S15 45.2
	11 194 38.1	31 57.0	54.9	340 35.5	28.4	154 25.3	08.8	221 15.7	52.6			
	12 209 40.6	46 57.0	N 6 54.2	355 36.3	S13 29.0	169 28.1	N14 08.7	236 18.3	S12 52.7	Schedar	349 31.7	N56 40.2
	13 224 43.1	61 57.1	53.5	10 37.1	29.6	184 30.9	08.6	251 20.8	52.7	Shaula	96 12.0	S37 07.3
	14 239 45.5	76 57.2	52.8	25 37.9	30.2	199 33.7	08.5	266 23.3	52.7	Sirius	258 27.1	S16 44.7
	15 254 48.0	91 57.3	52.1	40 38.8	30.7	214 36.4	8.8	281 25.8	52.7	Spica	158 23.7	N11 17.0
	16 269 50.5	106 57.4	51.5	55 39.6	31.3	229 39.2	08.3	296 28.4	52.7	Suhail	222 47.2	S43 31.3
	17 284 52.9	121 57.5	50.8	70 40.4	31.9	244 42.0	08.2	311 30.9	52.7			
	18 299 55.4	136 57.6	N 6 50.1	85 41.2	S13 32.5	259 44.8	N14 08.1	326 33.4	S12 52.8	Vega	80 34.1	N38 48.6
	19 314 57.9	151 57.7	49.4	100 42.0	33.1	274 47.5	08.0	341 35.9	52.8	Zuben'ubi	136 57.5	S16 08.3
	20 330 00.8	166 57.7	48.7	115 42.8	33.7	289 50.3	07.9	356 38.4	52.8			
	21 345 02.3	181 57.8	48.0	130 43.6	34.3	304 53.1	07.8	11 41.0	52.8		SHA	Mer. Pass.
	22 0 05.2	196 57.9	47.3	145 44.4	34.8	319 55.9	07.7	26 43.5	52.8	Venus	198 41.6	h m 8 52
	23 15 07.7	211 58.0	46.6	160 45.3	35.4	334 58.7	07.6	41 46.0	52.8	Mars	146 55.0	12 19
										Jupiter	319 36.3	0 49
										Saturn	26 35.5	20 17
Mer.Pass. 22 03.6												
v 0.1 d 0.7 v 0.8 d 0.6 v 2.8 d 0.1 v 2.5 d 0.0												

UT	SUN			MOON				Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec		v	Dec	d	HP		Naut.	Civil		19	20	21	22
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	h m	h m	h m	h m	h m	h m	h m	h m
1900 <															

UT	ARIES		VENUS −4.5		MARS +1.5		JUPITER −2.9		SATURN +0.6		STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
SUNDAY	22 00	30 10.2	226 58.1 N 6 46.0	175 46.1	S13 36.0	350 01.4	N14 07.5	56 48.5	S12 52.9	Acamar	315 12.1	S40 12.4	
	01	45 12.6	241 58.2 45.3	190 46.9	36.6	5 04.2	07.4	71 51.0	52.9	Achernar	335 20.3	S57 07.0	
	02	60 15.1	256 58.2 44.6	205 47.7	37.2	20 07.0	07.3	86 53.6	52.9	Acrux	173 01.9	S63 13.6	
	03	75 17.6	271 58.3 . . 43.9	220 48.5 . . 37.8	35 09.8 . . 07.2	101 56.1 . . 52.9	Adhara	255 06.6	S28 59.9				
	04	90 20.0	286 58.4 43.2	235 49.3	38.3	50 12.6	07.1	116 58.6	52.9	Aldebaran	290 40.5	N16 33.5	
	05	105 22.5	301 58.5 42.5	250 50.1	38.9	65 15.3	07.0	132 01.1	52.9				
	06	120 25.0	316 58.6 N 6 41.8	265 50.9	S13 39.5	80 18.1	N14 06.9	147 03.6	S12 52.9	Alioth	166 14.4	N55 49.9	
	07	135 27.4	331 58.6 41.1	280 51.7	40.1	95 20.9	06.8	162 06.1	53.0	Alkaid	152 53.3	N49 11.7	
	08	150 29.9	346 58.7 40.4	295 52.6	40.7	110 23.7	06.7	177 08.7	53.0	Alnair	27 34.0	S46 50.9	
	09	165 32.4	1 58.8 . . 39.7	310 53.4 . . 41.3	125 26.5 . . 06.6	192 11.2 . . 53.0	Alnilam	275 38.6	S 1 11.1				
	10	180 34.8	16 58.9 39.0	325 54.2	41.8	140 29.3	06.5	207 13.7	53.0	Alphard	217 48.9	S 8 45.5	
	11	195 37.3	31 58.9 38.3	340 55.0	42.4	155 32.0	06.4	222 16.2	53.0				
	12	210 39.7	46 59.0 N 6 37.6	355 55.8	S13 43.0	170 34.8	N14 06.3	237 18.7	S12 53.0	Alphecca	126 04.9	N26 38.2	
	13	225 42.2	61 59.1 36.9	10 56.6	43.6	185 37.6	06.2	252 21.3	53.1	Alpheratz	357 35.5	N29 13.4	
	14	240 44.7	76 59.2 36.2	25 57.4	44.2	200 40.4	06.1	267 23.8	53.1	Altair	62 01.0	N 8 56.0	
	15	255 47.1	91 59.2 . . 35.5	40 58.2 . . 44.8	215 43.2 . . 06.0	282 26.3 . . 53.1	Ankaa	353 07.8	S42 10.6				
	16	270 49.6	106 59.3 34.8	55 59.0	45.3	230 45.9	05.9	297 28.8	53.1	Antares	112 17.4	S26 29.1	
	17	285 52.1	121 59.4 34.1	70 59.8	45.9	245 48.7	05.8	312 31.3	53.1				
	18	300 54.5	136 59.5 N 6 33.4	86 00.6	S13 46.5	260 51.5	N14 05.7	327 33.8	S12 53.1	Arcturus	145 49.2	N19 03.6	
	19	315 57.0	151 59.5 32.7	101 01.4	47.1	275 54.3	05.6	342 36.4	53.1	Atria	107 13.0	S69 04.3	
	20	330 59.5	166 59.6 32.0	116 02.2	47.7	290 57.1	05.5	357 38.9	53.2	Avior	234 15.2	S59 34.7	
	21	346 01.9	181 59.7 . . 31.3	131 03.1 . . 48.2	305 59.8 . . 05.4	12 41.4 . . 53.2	Bellatrix	278 23.8	N 6 22.4				
	22	1 04.4	196 59.7 30.6	146 03.9	48.8	321 02.6	05.3	27 43.9	53.2	Betelgeuse	270 53.0	N 7 24.8	
	23	16 06.9	211 59.8 29.9	199 16.1	49.4	336 05.4	05.3	42 46.4	53.2				
MONDAY	23 00	31 09.3	226 59.9 N 6 29.2	176 05.5	S13 50.0	351 08.2	N14 05.2	57 48.9	S12 53.2	Canopus	263 52.6	S52 42.1	
	01	46 11.8	242 00.0 28.5	191 06.3	50.6	6 11.0	05.1	72 51.5	53.2	Capella	280 23.1	N46 01.2	
	02	61 14.2	257 00.0 27.8	206 07.1	51.1	21 13.8	05.0	87 54.0	53.3	Deneb	49 26.5	N45 22.1	
	03	76 16.7	272 00.1 . . 27.0	221 07.9 . . 51.7	36 16.5 . . 04.9	102 56.5 . . 53.3	Denebola	182 26.3	N14 26.5				
	04	91 19.2	287 00.2 26.3	236 08.7	52.3	51 19.3	04.8	117 59.0	53.3	Diphda	348 48.0	S17 51.3	
	05	106 21.6	302 00.2 25.6	251 09.5	52.9	66 22.1	04.7	133 01.5	53.3				
	06	121 24.1	317 00.3 N 6 24.9	266 10.3	S13 53.5	81 24.9	N14 04.6	148 04.0	S12 53.3	Dubhe	193 42.7	N61 37.3	
	07	136 26.6	332 00.4 24.2	281 11.1	54.0	96 27.7	04.5	163 06.5	53.3	El Nath	278 02.9	N28 37.6	
	08	151 29.0	347 00.4 23.5	296 11.9 . . 54.6	111 30.5	04.4	178 09.1	53.3	Eltanin	90 42.9	N51 29.4		
	09	166 31.5	2 00.5 . . 22.8	311 12.7 . . 55.2	126 33.2 . . 04.3	193 11.6 . . 53.4	Enif	33 39.7	N 9 59.2				
	10	181 34.0	17 00.5 22.1	326 13.5	55.8	141 36.0	04.2	208 14.1	53.4	Fomalhaut	15 15.4	S29 29.8	
	11	196 36.4	32 00.6 21.3	341 14.3	56.4	156 38.8	04.1	223 16.6	53.4				
	12	211 38.9	47 00.7 N 6 20.6	356 15.1	S13 56.9	171 41.6	N14 04.0	238 19.1	S12 53.4	Gacrux	171 53.4	S57 14.6	
	13	226 41.3	62 00.7 19.9	11 15.9	57.5	186 44.4	03.9	253 21.6	53.4	Gienah	175 45.0	S17 40.2	
	14	241 43.8	77 00.8 19.2	26 16.7	58.1	201 47.2	03.8	268 24.1	53.4	Hadar	148 38.2	S60 29.2	
	15	256 46.3	92 00.9 . . 18.5	41 17.5 . . 58.7	216 49.9 . . 03.7	283 26.7 . . 53.4	Hamal	327 52.0	N23 34.6				
	16	271 48.7	107 00.9 17.8	56 18.3	59.2	231 52.7	03.6	298 29.2	53.5	Kaus Aust.	83 34.1	S34 22.5	
	17	286 51.2	122 01.0 17.0	71 19.1	13 59.8	246 55.5	03.5	313 31.7	53.5				
	18	301 53.7	137 01.0 N 6 16.3	86 20.0	S14 00.4	261 58.3	N14 03.4	328 34.2	S12 53.5	Kochab	137 20.9	N74 03.5	
	19	316 56.1	152 01.1 15.6	101 20.8	01.0	277 01.1	03.3	343 36.7	53.5	Markab	13 30.7	N15 20.1	
	20	331 58.6	167 01.2 14.9	116 21.6	01.6	292 03.9	03.2	358 39.2	53.5	Menkar	314 06.9	N 4 11.1	
	21	347 01.1	182 01.2 . . 14.2	131 22.4 . . 02.1	307 06.7 . . 03.1	13 41.7 . . 53.5	Menkent	147 59.3	S36 29.1				
	22	2 03.5	197 01.3 13.4	146 23.2	02.7	322 09.4	03.0	28 44.2	53.5	Miaplacidus	221 38.8	S69 48.5	
	23	17 06.0	212 01.3 12.7	161 24.0	03.3	337 12.2	02.9	43 46.8	53.5				
TUESDAY	24 00	32 08.5	227 01.4 N 6 12.0	176 24.8	S14 03.9	352 15.0	N14 02.8	58 49.3	S12 53.6	Mirfak	308 29.3	N49 56.7	
	01	47 10.9	242 01.4 11.3	191 25.6	04.4	7 17.8	02.7	73 51.8	53.6	Nunki	75 49.1	S26 16.1	
	02	62 13.4	257 01.5 10.5	206 26.4	05.0	22 20.6	02.6	88 54.3	53.6	Peacock	53 07.3	S56 39.7	
	03	77 15.8	272 01.5 . . 09.8	221 27.2 . . 05.6	37 23.4 . . 02.5	103 56.8 . . 53.6	Pollux	243 18.5	N27 58.1				
	04	92 18.3	287 01.6 09.1	236 28.0	06.2	52 26.2	02.4	118 59.3	53.6	Procyon	244 51.9	N 5 10.0	
	05	107 20.8	302 01.7 08.4	251 28.8	06.7	67 28.9	02.3	134 01.8	53.6				
	06	122 23.2	317 01.7 N 6 07.6	266 29.6	S14 07.3	82 31.7	N14 02.2	149 04.3	S12 53.6	Rasalhague	95 59.7	N12 32.7	
	07	137 25.7	332 01.8 06.9	281 30.4	07.9	97 34.5	02.1	164 06.8	53.6	Regulus	207 35.7	N11 51.2	
	08	152 28.2	347 01.8 06.2	296 31.2	08.5	112 37.3	02.0	179 09.4	53.7	Rigel	281 04.6	S 8 10.3	
	09	167 30.6	2 01.9 . . 05.4	311 32.0 . . 09.0	127 40.1 . . 01.9	194 11.9 . . 53.7	Rigel Kent.	139 42.4	S60 55.9				
	10	182 33.1	17 01.9 04.7	326 32.8	09.6	142 42.9	01.8	209 14.4	53.7	Sabik	102 04.2	S15 45.2	
	11	197 35.6	32 02.0 04.0	341 33.6	10.2	157 45.7	01.7	224 16.9	53.7				
	12	212 38.0	47 02.0 N 6 03.2	356 34.4	S14 10.8	172 48.4	N14 01.6	239 19.4	S12 53.7	Schedar	349 31.7	N56 40.2	
	13	227 40.5	62 02.1 02.5	11 35.2	11.3	187 51.2	01.5	254 21.9	53.7	Shaula	96 12.0	S37 07.3	
	14	242 43.0	77 02.1 01.8	26 35.9	11.9	202 54.0	01.4	269 24.4	53.7	Sirius	258 27.0	S16 44.7	
	15	257 45.4	92 02.2 . . 01.0	41 36.7 . . 12.5	217 56.8 . . 01.3	284 26.9 . . 53.7	Spica	158 23.7	S11 17.0				
	16	272 47.9	107 02.2 6 00.3	56 37.5	13.1	232 59.6	01.2	299 29.4	53.8	Suhail	222 47.2	S43 31.3	
	17	287 50.3	122 02.3 5 59.6	71 38.3	13.6	248 02.4	01.1	314 31.9	53.8				
	18	302 52.8	137 02.3 N 5 58.8	86 39.1	S14 14.2	263 05.2	N14 01.0	329 34.4	S12 53.8	Vega	80 34.1	N38 48.6	
	19	317 55.3	152 02.3 58.1	101 39.9	14.8	278 07.9	00.9	344 37.0	53.8	Zuben'ubi	136 57.5	S16 08.3	
	20	332 57.7	167 02.4 57.4	116 40.7	15.4	293 10.7	00.8	359 39.5	53.8				
	21	348 00.2	182 02.4 . . 56.6	131 41.5 . . 15.9	308 13.5 . . 00.7	14 42.0 . . 53.8							
	22	3 02.7	197 02.5 55.9	146 42.3	16.5	323 16.3	00.6	29 44.5	53.8	Venus	195 50.6	h 8 52	
	23	18 05.1	212 02.5 55.1	161 43.1	17.1	338 19.1	00.5	44 47.0	53.8	Mars	144 56.2	12 15	
										Jupiter	319 58.9	0 35	
										Saturn	26 39.6	20 05	
Mer. Pass. 21 51.8		v 0.1	d 0.7	v 0.8	d 0.6	v 2.8	d 0.1	v 2.5	d 0.0				

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise									
	GHA		Dec	v	GHA		Dec	d		HP	Naut.		Civil	22	23	24	25					
	°	'			°	'												°	'			
SUNDAY	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m		
	00	183	51.3	S10	52.8	90	36.3	5.5	S26	03.0	7.0	58.8	N	72	05	28	06	47	08	03		
	01	198	51.4		53.7	105	00.8	5.6	25	56.0	7.2	58.8	N	70	05	28	06	40	07	46		
	02	213	51.5			119	25.4	5.5	25	48.8	7.4	58.9	68	05	28	06	33	07	33			
	03	228	51.6		55.4	133	49.9	5.7	25	41.4	7.5	58.9	66	05	28	06	28	07	22			
	04	243	51.7		56.3	148	14.6	5.7	25	33.9	7.8	58.9	64	05	28	06	23	07	13			
	05	258	51.8		57.2	162	39.3	5.7	25	26.1	7.8	58.9	62	05	27	06	19	07	05			
	06	273	51.8	S10	58.1	177	04.0	5.8	S25	18.3	8.1	58.9	60	05	27	06	15	06	58			
	07	288	51.9		59.0	191	28.8	5.9	25	10.2	8.2	59.0	58	05	26	06	12	06	52			
	08	303	52.0	10	59.8	205	53.7	5.9	25	02.0	8.4	59.0	56	05	25	06	09	06	47			
	09	318	52.1	11	00.7	220	18.6	6.0	24	53.6	8.5	59.0	54	05	25	06	06	06	42			
	10	333	52.2		01.6	234	43.6	6.0	24	45.1	8.7	59.0	52	05	24	06	03	06	38			
	11	348	52.3		02.5	249	08.6	6.1	24	36.4	8.8	59.0	50	05	23	06	01	06	34			
	12		3	52.4	S11	03.4	263	33.7	6.2	S24	27.6	9.0	59.1	45	05	21	05	56	06	26		
	13		18	52.5		04.3	277	58.9	6.2	24	18.6	9.2	59.1	N	40	05	19	05	51	06	19	
	14		33	52.6		05.2	292	24.1	6.3	24	09.4	9.3	59.1	35	05	17	05	47	06	12		
	15		48	52.7		06.0	306	49.4	6.4	24	00.1	9.5	59.1	30	05	15	05	43	06	07		
	16		63	52.8		06.9	321	14.8	6.4	23	50.6	9.7	59.1	20	05	09	05	35	05	57		
	17		78	52.9		07.8	335	40.2	6.5	23	40.9	9.8	59.2	N	10	05	03	05	28	05	49	
	18		93	53.0	S11	08.7	350	05.7	6.6	S23	31.1	9.9	59.2	0	04	55	05	20	05	41		
	19		108	53.1		09.6	4	31.3	6.6	23	21.2	10.1	59.2	S	10	04	46	05	11	05	33	
	20		123	53.2		10.4	18	56.9	6.7	23	11.1	10.2	59.2	20	04	35	05	01	05	24		
	21		138	53.3		11.3	33	22.6	6.8	23	00.9	10.4	59.2	30	04	20	04	49	05	14		
	22		153	53.4		12.2	47	48.4	6.8	22	50.5	10.6	59.3	35	04	10	04	42	05	08		
	23		168	53.5		13.1	62	14.2	6.9	22	39.9	10.6	59.3	40	03	59	04	33	05	01		
MONDAY	00	183	53.5	S11	14.0	76	40.1	7.0	S22	29.3	10.9	59.3	45	03	45	04	22	04	53			
	01	198	53.6		14.8	91	06.1	7.0	22	18.4	10.9	59.3	S	50	03	26	04	09	04	44		
	02	213	53.7		15.7	105	32.1	7.1	22	07.5	11.1	59.3	52	03	17	04	03	04	39			
	03	228	53.8		16.6	119	58.2	7.2	21	56.4	11.3	59.3	54	03	07	03	56	04	35			
	04	243	53.9		17.5	134	24.4	7.3	21	45.1	11.4	59.4	56	02	55	03	48	04	29			
	05	258	54.0		18.4	148	50.7	7.3	21	33.7	11.5	59.4	58	02	41	03	39	04	23			
	06	273	54.1	S11	19.2	163	17.0	7.4	S21	22.2	11.7	59.4	S	60	02	23	03	29				
	07	288	54.2		20.1	177	43.4	7.5	21	10.5	11.8	59.4										
	08	303	54.3		21.0	192	09.9	7.6	20	58.7	11.9	59.4	Lat.	Sunset	Twilight		Moonset					
	09	318	54.4		21.9	206	36.5	7.6	20	46.8	12.1	59.4	Civil	Naut.	22	23	24	25				
	10	333	54.4		22.7	221	03.1	7.7	20	34.7	12.1	59.5										
	11	348	54.5		23.6	235	29.8	7.8	20	22.6	12.4	59.5										
	12		3	54.6	S11	24.5	249	56.6	7.8	S20	10.2	12.4	59.5	N	72	15	24	16	39			
	13		18	54.7		25.4	264	23.4	7.9	19	57.8	12.6	59.5	N	70	15	41	16	47			
	14		33	54.8		26.2	278	50.3	8.0	19	45.2	12.7	59.5	68	15	54	16	54				
	15		48	54.9		27.1	293	17.3	8.1	19	32.5	12.8	59.6	70	16	05	17	00				
	16		63	55.0		28.0	307	44.4	8.1	19	19.7	12.9	59.6	66	16	05	17	00				
	17		78	55.1		28.9	322	11.5	8.2	19	06.8	13.1	59.6	64	16	14	17	04				
	18		93	55.1	S11	29.7	336	38.7	8.3	S18	53.7	13.2	59.6	62	16	22	17	09				
	19		108	55.2		30.6	351	06.0	8.3	18	40.5	13.3	59.6	60	16	29	17	12				
	20		123	55.3		31.5	5	33.3	8.5	18	27.2	13.4	59.6	58	16	35	17	16				
	21		138	55.4		32.4	20	00.8	8.4	18	13.8	13.5	59.6	56	16	41	17	19				
	22		153	55.5		33.2	34	28.2	8.6	18	00.3	13.7	59.7	54	16	45	17	22				
	23		168	55.6		34.1	48	55.8	8.6	17	46.6	13.7	59.7	52	16	50	17	24				
	TUESDAY	00	183	55.7	S11	35.0	63	23.4	8.7	S17	32.9	13.9	59.7	50	16	54	17	27				
01		198	55.7		35.9	77	51.1	8.8	17	19.0	13.9	59.7	45	17	02	17	32					
02		213	55.8		36.7	92	18.9	8.8	17	05.1	14.1	59.7	40	17	02	17	32					
03		228	55.9		37.6	106	46.7	8.9	16	51.0	14.2	59.7	35	17	01	17	46					
04		243	56.0		38.5	121	14.6	9.0	16	36.8	14.2	59.7	30	17	21	17	46					
05		258	56.1		39.3	135	42.6	9.1	16	22.6	14.4	59.8	20	17	31	17	53					
06		273	56.2	S11	40.2	150	10.7	9.1	S16	08.2	14.5	59.8	N	10	17	40						
07		288	56.2		41.1	164	38.8	9.1	15	53.7	14.6	59.8	0	17	48	18	01					
08		303	56.3		42.0	179	06.9	9.3	15	39.1	14.6	59.8	10	17	48	18	09					
09		318	56.4		42.8	193	35.2	9.3	15	24.5	14.8	59.8	20	18	01	18	19					
10		333	56.5		43.7	208	03.5	9.3	15	09.7	14.9	59.8	30	18	15	18	40					
11		348	56.6		44.6	222	31.8	9.4	14	54.8	14.9	59.8	40	18	28	18	57					
12			3	56.7	S11	45.4	237	00.2	9.5	S14	39.9	15.0	59.8	45	18	36	19	07				
13			18	56.7		46.3	251	28.7	9.6	14	24.9	15.2	59.9	S	10	17	56					
14			33	56.8		47.2	265	57.3	9.6	14	09.7	15.2	59.9	20	18	05	18	28				
15			48	56.9		48.0	280	25.9	9.6	13	54.5	15.3	59.9	30	18	15	18	48				
16			63	57.0		48.9	294	54.5	9.8	13	39.2	15.3	59.9	40	18	28	18	57				
17			78	57.1		49.8	309	23.3	9.8	13	23.9	15.5	59.9	50	19	07	19	52				
18			93	57.1	S11	50.6	323	52.1	9.8	S13	08.4	15.5	59.9	S	60	19	14					
19			108	57.2		51.5	338	20.9	9.9	12	52.9	15.6	59.9									
20			123	57.3		52.4	352	49.8	9.9	12	37.3	15.7	59.9	SUN	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
21			138	57.4		53.2	7	18.7	10.0	12	21.6	15.8	59.9	Mer.	00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
22			153	57.4		54.1	21	47.7	10.1	12	05.8	15.8	60.0	22	15	25	15	30	11	45	18	41
23			168	57.5		55.0	36	16.8	10.1	S11	50.0	15.9	60.0	23	15	34	15	38	11	44	19	37
			SD	16.1	d	0.9	SD	16.1	16.2		16.3			24	15	42	15	46	11	44	20	30

UT		ARIES			VENUS −4.5			MARS +1.5			JUPITER −2.9			SATURN +0.6			STARS					
		GHA		GHA	Dec	GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	Name	SHA	Dec		
d h		° ′		° ′	° ′	° ′		° ′	° ′		° ′	° ′		° ′	° ′		° ′		° ′	° ′		
WEDNESDAY	25 00	33	07.6	227	02.6	N 5	54.4	176	43.9	S14	17.6	353	21.9	N14	00.4	59	49.5	S12	53.9	Acamar	315 12.1	S40 12.4
	01	48	10.1	242	02.6		53.7	191	44.7		18.2	8	24.7		00.3	74	52.0		53.9	Achernar	335 20.3	S57 07.0
	02	63	12.5	257	02.7		52.9	206	45.5		18.8	23	27.5		00.2	89	54.5		53.9	Acrux	173 01.9	S63 13.6
	03	78	15.0	272	02.7		52.2	221	46.3		19.4	38	30.2		00.1	104	57.0		53.9	Adhara	255 06.5	S29 00.0
	04	93	17.4	287	02.7		51.4	236	47.1		19.9	53	33.0	14	00.0	119	59.5		53.9	Aldebaran	290 40.5	N16 33.5
	05	108	19.9	302	02.8		50.7	251	47.9		20.5	68	35.8	13	59.9	135	02.0		53.9			
	06	123	22.4	317	02.8	N 5	49.9	266	48.7	S14	21.1	83	38.6	N13	59.8	150	04.5	S12	53.9	Alioth	166 14.4	N55 49.8
	07	138	24.8	332	02.9		49.2	281	49.5		21.6	98	41.4		59.7	165	07.0		53.9	Alkaid	152 53.3	N49 11.7
	08	153	27.3	347	02.9		48.5	296	50.3		22.2	113	44.2		59.6	180	09.6		53.9	Alnair	27 34.0	S46 50.9
	09	168	29.8	2	02.9		47.7	311	51.1		22.8	128	47.0		59.5	195	12.1		54.0	Alnilam	275 38.6	S 1 11.1
	10	183	32.2	17	03.0		47.0	326	51.9		23.4	143	49.8		59.4	210	14.6		54.0	Alphard	217 48.9	S 8 45.5
	11	198	34.7	32	03.0		46.2	341	52.7		23.9	158	52.6		59.3	225	17.1		54.0			
	12	213	37.2	47	03.1	N 5	45.5	356	53.4	S14	24.5	173	55.3	N13	59.2	240	19.6	S12	54.0	Alphecca	126 05.0	N26 38.2
	13	228	39.6	62	03.1		44.7	11	54.2		25.1	188	58.1		59.1	255	22.1		54.0	Alpheratz	357 35.5	N29 13.4
	14	243	42.1	77	03.1		44.0	26	55.0		25.6	204	00.9		59.0	270	24.6		54.0	Altair	62 01.0	N 8 56.0
	15	258	44.6	92	03.2		43.2	41	55.8		26.2	219	03.7		58.9	285	27.1		54.0	Ankaa	353 07.8	S42 10.7
	16	273	47.0	107	03.2		42.5	56	56.6		26.8	234	06.5		58.8	300	29.6		54.0	Antares	112 17.4	S26 29.1
	17	288	49.5	122	03.2		41.7	71	57.4		27.3	249	09.3		58.7	315	32.1		54.0			
	18	303	51.9	137	03.3	N 5	41.0	86	58.2	S14	27.9	264	12.1	N13	58.6	330	34.6	S12	54.1	Arcturus	145 49.2	N19 03.6
	19	318	54.4	152	03.3		40.2	101	59.0		28.5	279	14.9		58.5	345	37.1		54.1	Atria	107 13.0	S69 04.3
	20	333	56.9	167	03.3		39.5	116	59.8		29.1	294	17.7		58.4	0	39.6		54.1	Avior	234 15.2	S59 34.7
	21	348	59.3	182	03.4		38.7	132	00.6		29.6	309	20.4		58.3	15	42.1		54.1	Bellatrix	278 23.8	N 6 22.4
	22	4	01.8	197	03.4		38.0	147	01.4		30.2	324	23.2		58.2	30	44.6		54.1	Betelgeuse	270 53.0	N 7 24.8
	23	19	04.3	212	03.4		37.2	162	02.2		30.8	339	26.0		58.1	45	47.1		54.1			
THURSDAY	26 00	34	06.7	227	03.5	N 5	36.4	177	02.9	S14	31.3	354	28.8	N13	58.0	60	49.6	S12	54.1	Canopus	263 52.6	S52 42.1
	01	49	09.2	242	03.5		35.7	192	03.7		31.9	9	31.6		57.9	75	52.1		54.1	Capella	280 23.1	N46 01.2
	02	64	11.7	257	03.5		34.9	207	04.5		32.5	24	34.4		57.8	90	54.6		54.1	Deneb	49 26.5	N45 22.1
	03	79	14.1	272	03.6		34.2	222	05.3		33.0	39	37.2		57.7	105	57.1		54.1	Denebola	182 26.3	N14 26.5
	04	94	16.6	287	03.6		33.4	237	06.1		33.6	54	40.0		57.6	120	59.6		54.2	Diphda	348 48.0	S17 51.3
	05	109	19.0	302	03.6		32.7	252	06.9		34.2	69	42.8		57.5	136	02.1		54.2			
	06	124	21.5	317	03.6	N 5	31.9	267	07.7	S14	34.7	84	45.5	N13	57.4	151	04.7	S12	54.2	Dubhe	193 42.7	N61 37.2
	07	139	24.0	332	03.7		31.1	282	08.5		35.3	99	48.3		57.3	166	07.2		54.2	Elnath	278 02.9	N28 37.6
	08	154	26.4	347	03.7		30.4	297	09.3		35.9	114	51.1		57.2	181	09.7		54.2	Eltanin	90 43.0	N51 29.3
	09	169	28.9	2	03.7		29.6	312	10.0		36.4	129	53.9		57.1	196	12.2		54.2	Enif	33 39.7	N 9 59.1
	10	184	31.4	17	03.8		28.8	327	10.8		37.0	144	56.7		57.0	211	14.7		54.2	Fomalhaut	15 15.4	S29 29.8
	11	199	33.8	32	03.8		28.1	342	11.6		37.6	159	59.5		56.9	226	17.2		54.2			
	12	214	36.3	47	03.8	N 5	27.3	357	12.4	S14	38.1	175	02.3	N13	56.8	241	19.7	S12	54.2	Gacrux	171 53.4	S57 14.6
	13	229	38.8	62	03.8		26.6	12	13.2		38.7	190	05.1		56.7	256	22.2		54.2	Gienah	175 44.9	S17 40.2
	14	244	41.2	77	03.9		25.8	27	14.0		39.3	205	07.9		56.6	271	24.7		54.3	Hadar	148 38.2	S60 29.1
	15	259	43.7	92	03.9		25.0	42	14.8		39.8	220	10.7		56.5	286	27.2		54.3	Hamal	327 52.0	N23 34.6
	16	274	46.2	107	03.9		24.3	57	15.6		40.4	235	13.5		56.4	301	29.7		54.3	Kaus Aust.	83 34.1	S34 22.5
	17	289	48.6	122	03.9		23.5	72	16.3		41.0	250	16.2		56.3	316	32.2		54.3			
	18	304	51.1	137	04.0	N 5	22.7	87	17.1	S14	41.5	265	19.0	N13	56.2	331	34.7	S12	54.3	Kochab	137 20.9	N74 03.5
	19	319	53.5	152	04.0		22.0	102	17.9		42.1	280	21.8		56.1	346	37.2		54.3	Markab	13 30.7	N15 20.1
	20	334	56.0	167	04.0		21.2	117	18.7		42.7	295	24.6		56.0	1	39.7		54.3	Menkar	314 06.9	N 4 11.1
	21	349	58.5	182	04.0		20.4	132	19.5		43.2	310	27.4		55.9	16	42.2		54.3	Menkent	147 59.3	S36 29.1
	22	5	00.9	197	04.0		19.6	147	20.3		43.8	325	30.2		55.8	31	44.7		54.3	Miaplacidus	221 38.7	S69 48.5
	23	20	03.4	212	04.1		18.9	162	21.1		44.4	340	33.0		55.7	46	47.2		54.3			
FRIDAY	27 00	35	05.9	227	04.1	N 5	18.1	177	21.8	S14	44.9	355	35.8	N13	55.6	61	49.7	S12	54.3	Mirfak	308 29.3	N49 56.7
	01	50	08.3	242	04.1		17.3	192	22.6		45.5	10	38.6		55.5	76	52.2		54.3	Nunki	75 49.2	S26 16.1
	02	65	10.8	257	04.1		16.6	207	23.4		46.0	25	41.4		55.4	91	54.7		54.4	Peacock	53 07.3	S56 39.7
	03	80	13.3	272	04.1		15.8	222	24.2		46.6	40	44.2		55.3	106	57.2		54.4	Pollux	243 18.5	N27 58.1
	04	95	15.7	287	04.2		15.0	237	25.0		47.2	55	46.9		55.2	121	59.7		54.4	Procyon	244 51.9	N 5 10.0
	05	110	18.2	302	04.2		14.2	252	25.8		47.7	70	49.7		55.1	137	02.2		54.4			
	06	125	20.7	317	04.2	N 5	13.5	267	26.5	S14	48.3	85	52.5	N13	55.0	152	04.7	S12	54.4	Rasalhague	95 59.7	N12 32.7
	07	140	23.1	332	04.2		12.7	282	27.3		48.9	100	55.3		54.9	167	07.2		54.4	Regulus	207 35.7	N11 51.2
	08	155	25.6	347	04.2		11.9	297	28.1		49.4	115	58.1		54.8	182	09.7		54.4	Rigel	281 04.6	S 8 10.3
	09	170	28.0	2	04.2		11.1	312	28.9		50.0	131	00.9		54.7	197	12.2		54.4	Rigel Kent.	139 42.4	S60 55.9
	10	185	30.5	17	04.3		10.4	327	29.7		50.5	146	03.7		54.6	212	14.7		54.4	Sabik	102 04.2	S15 45.2
	11	200	33.0	32	04.3		09.6	342	30.5		51.1	161	06.5		54.5	227	17.2		54.4			
	12	215	35.4	47	04.3	N 5	08.8	357	31.2	S14	51.7	176	09.									

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise													
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	25	26	27	28								
	°	'			°	'						°							'							
WEDNESDAY	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m	h m							
	25 00	183	57.6	S11	55.8	50	45.9	10.2	S11	34.1	16.0	60.0	N 72	05 41	07 01	08 20	16 42	16 03	15 25	14 38						
	01	198	57.7		56.7	65	15.1	10.2		11	18.1	16.1	60.0	N 70	05 39	06 51	08 00	16 32	16 03	15 34	15 00					
	02	213	57.8		57.6	79	44.3	10.2		11	02.0	16.1	60.0	68	05 38	06 44	07 45	16 24	16 02	15 41	15 17					
	03	228	57.8		58.4	94	13.5	10.3		10	45.9	16.2	60.0	66	05 37	06 37	07 33	16 17	16 02	15 47	15 31					
	04	243	57.9	11	59.3	108	42.8	10.4		10	29.7	16.2	60.0	64	05 36	06 31	07 22	16 11	16 01	15 52	15 42					
	05	258	58.0	12	00.1	123	12.2	10.4		10	13.5	16.3	60.0	62	05 35	06 27	07 14	16 06	16 01	15 57	15 52					
	06	273	58.1	S12	01.0	137	41.6	10.4	S	9	57.2	16.3	60.0	60	05 33	06 22	07 06	16 01	16 01	16 00	16 00					
	07	288	58.1		01.9	152	11.0	10.5		9	40.9	16.5	60.0	N 58	05 32	06 18	06 59	15 57	16 01	16 04	16 08					
	08	303	58.2		02.7	166	40.5	10.6		9	24.4	16.4	60.0	56	05 31	06 15	06 54	15 54	16 00	16 07	16 15					
	09	318	58.3		03.6	181	10.1	10.5		9	08.0	16.6	60.0	54	05 30	06 11	06 48	15 51	16 00	16 10	16 21					
	10	333	58.4		04.5	195	39.6	10.7		8	51.4	16.5	60.0	52	05 29	06 09	06 43	15 48	16 00	16 12	16 26					
	11	348	58.4		05.3	210	09.3	10.6		8	34.9	16.7	60.1	50	05 28	06 06	06 39	15 45	16 00	16 15	16 33					
	12		3 58.5	S12	06.2	224	38.9	10.7	S	8	18.2	16.6	60.1	45	05 25	06 00	06 30	15 39	16 00	16 20	16 42					
	13		18 58.6		07.0	239	08.6	10.7		8	01.6	16.8	60.1	N 40	05 22	05 54	06 22	15 34	15 59	16 24	16 51					
	14		33 58.7		07.9	253	38.3	10.8		7	44.8	16.7	60.1	35	05 20	05 49	06 15	15 30	15 59	16 28	16 58					
	15		48 58.7		08.8	268	08.1	10.8		7	28.1	16.8	60.1	30	05 17	05 45	06 09	15 26	15 59	16 31	17 05					
	16		63 58.8		09.6	282	37.9	10.8		7	11.3	16.9	60.1	20	05 10	05 36	05 59	15 20	15 58	16 37	17 17					
	17		78 58.9		10.5	297	07.7	10.9		6	54.4	16.9	60.1	N 10	05 03	05 28	05 49	15 14	15 58	16 42	17 27					
	18		93 58.9	S12	11.3	311	37.6	10.9	S	6	37.5	16.9	60.1	0	04 55	05 19	05 41	15 08	15 58	16 47	17 37					
	19		108 59.0		12.2	326	07.5	10.9		6	20.6	17.0	60.1	S 10	04 45	05 10	05 32	15 03	15 58	16 52	17 47					
	20		123 59.1		13.1	340	37.4	11.0		6	03.6	17.0	60.1	20	04 33	04 59	05 22	14 57	15 57	16 58	17 58					
	21		138 59.2		13.9	355	07.4	11.0		5	46.6	17.0	60.1	30	04 17	04 46	05 11	14 50	15 57	17 04	18 11					
	22		153 59.2		14.8		9 37.4	11.0		5	29.6	17.1	60.1	35	04 06	04 38	05 05	14 47	15 57	17 07	18 18					
	23		168 59.3		15.6		24 07.4	11.0		5	12.5	17.1	60.1	40	03 54	04 29	04 57	14 42	15 57	17 11	18 26					
THURSDAY	26 00	183	59.4	S12	16.5	38	37.4	11.1	S	4	55.4	17.1	60.1	45	03 39	04 17	04 49	14 37	15 57	17 16	18 36					
	01	198	59.4		17.3	53	07.5	11.1		4	38.3	17.2	60.1	S 50	03 19	04 03	04 38	14 31	15 57	17 22	18 48					
	02	213	59.5		18.2	67	37.6	11.1		4	21.1	17.1	60.1	52	03 09	03 56	04 33	14 28	15 56	17 25	18 53					
	03	228	59.6		19.1	82	07.7	11.1		4	04.0	17.2	60.1	54	02 58	03 49	04 28	14 25	15 56	17 28	19 00					
	04	243	59.7		19.9	96	37.8	11.2		3	46.8	17.3	60.1	56	02 45	03 40	04 22	14 21	15 56	17 31	19 06					
	05	258	59.7		20.8	111	08.0	11.1		3	29.5	17.2	60.1	58	02 29	03 30	04 15	14 18	15 56	17 35	19 14					
	06	273	59.8	S12	21.6	125	38.1	11.2	S	3	12.3	17.2	60.1	S 60	02 10	03 19	04 08	14 13	15 56	17 39	19 23					
	07	288	59.9		22.5	140	08.3	11.2		2	55.1	17.3	60.1		Lat.	Sunset		Twilight		Moonset						
	08	303	59.9		23.3	154	38.5	11.2		2	37.8	17.3	60.1			Civil		Naut.		25		26		27		28
	09	319	00.0		24.2	169	08.7	11.3		2	20.5	17.3	60.1		°	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	10	334	00.1		25.0	183	39.0	11.2		2	03.2	17.3	60.1	N 72	15 07	16 25	17 45	26 37	02 37	05 04	07 38					
	11	349	00.1		25.9	198	09.2	11.2		1	45.9	17.3	60.1	N 70	15 26	16 35	17 47	00 20	02 43	04 59	07 19					
	12		4 00.2	S12	26.8	212	39.4	11.3	S	1	28.6	17.3	60.1	68	15 42	16 43	17 48	00 36	02 48	04 55	07 05					
	13		19 00.3		27.6	227	09.7	11.3		1	11.3	17.4	60.1	70	15 54	16 50	17 50	00 50	02 53	04 52	06 53					
	14		34 00.3		28.5	241	40.0	11.3		0	53.9	17.3	60.1	66	16 04	16 55	17 51	01 01	02 56	04 49	06 43					
	15		49 00.4		29.3	256	10.3	11.2		0	36.6	17.3	60.1	64	16 13	17 00	17 52	01 10	02 59	04 47	06 35					
	16		64 00.5		30.2	270	40.5	11.3		0	19.3	17.4	60.1	62	16 21	17 05	17 53	01 18	03 02	04 45	06 28					
	17		79 00.5		31.0	285	10.8	11.3	S	0	01.9	17.3	60.1	60	16 28	17 09	17 55	01 25	03 04	04 43	06 21					
	18		94 00.6	S12	31.9	299	41.1	11.3	N	0	15.4	17.3	60.1	N 58	16 34	17 12	17 56	01 31	03 07	04 41	06 16					
	19		109 00.6		32.7	314	11.4	11.3		0	32.7	17.4	60.1	56	16 39	17 16	17 57	01 36	03 08	04 40	06 11					
	20		124 00.7		33.6	328	41.7	11.3		0	50.1	17.3	60.0	54	16 44	17 19	17 58	01 41	03 10	04 38	06 07					
	21		139 00.8		34.4	343	12.0	11.3		1	07.4	17.3	60.0	52	16 48	17 21	17 59	01 45	03 12	04 37	06 03					
	22		154 00.8		35.3	357	42.3	11.3		1	24.7	17.3	60.0	50	16 58	17 28	18 02	01 55	03 15	04 35	05 54					
	23		169 00.9		36.1	12	12.6	11.3		1	42.0	17.3	60.0	45	17 06	17 33	18 05	02 03	03 18	04 32	05 47					
FRIDAY	27 00	184	01.0	S12	37.0	26	42.9	11.2	N	1	59.3	17.2	60.0	N 40	17 12	17 38	18 08	02 09	03 20	04 31	05 41					
	01	199	01.0		37.8	41	13.1	11.3		2	16.5	17.3	60.0	35	17 18	17 43	18 11	02 15	03 22	04 29	05 36					
	02	214	01.1		38.7	55	43.4	11.3		2	33.8	17.2	60.0	30	17 29	17 52	18 17	02 25	03 26	04 26	05 26					
	03	229	01.2		39.5	70	13.7	11.2		2	51.0	17.3	60.0	20	17 38	18 00	18 25	02 34	03 29	04 23	05 18					
	04	244	01.2		40.4	84	43.9	11.3		3	08.3	17.2	60.0	N 10	17 47	18 09	18 33	02 42	03 32	04 21	05 11					
	05	259	01.3		41.2	99	14.2	11.2		3	25.5	17.1	60.0	0	17 56	18 18	18 43	02 50	03 35	04 19	05 03					
	06	274	01.3	S12	42.0	113	44.4	11.3	N	3	42.6	17.2	60.0	S 10	18 06	18 29	18 56	02 58	03 38	04 16	04 55					
	07	289	01.4		42.9	128	14.7	11.2		3	59.8	17.1	60.0	20	18 17	18 42	19 12	03 08	03 41	04 13	04 46					
	08	304	01.5		43.7	142	44.9	11.2		4	16.9	17.1	59.9	30	18 24	18 51	19 22	03 13	03 43	04 12	04 41					
	09	319	01.5		44.6	157	15.1	11.2		4	34.0	17.1	59.9	35	18 32	19 00	19 35	03 19	03 45	04 10	04 35					
	10	334	01.6		45.4	171	45.3	11.1		4	51.1	17.0	59.9	40	18 40	19 12	19 50	03 26	03 48	04 08	04 28					
	11	349	01.6		46.3	186	15.4	11.2		5	08.1	17.0	5													

UT	ARIES			VENUS −4.4			MARS +1.5			JUPITER −2.9			SATURN +0.7			STARS						
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec								
28	00	36 05.0	227 04.4 N 4 59.4	177 40.6 S14 58.4	356 42.8 N13 53.1	62 49.6 S12 54.5	Acamar	315 12.1 S40 12.4														
	01	51 07.5	242 04.4 58.6	192 41.4 59.0	11 45.6 53.0	77 52.1 54.5	Achernar	335 20.3 S57 07.0														
	02	66 09.9	257 04.4 57.8	207 42.2 14 59.5	26 48.4 52.9	92 54.6 54.5	Acru	173 01.9 S63 13.6														
	03	81 12.4	272 04.4 57.0	222 42.9 15 00.1	41 51.2 52.8	107 57.1 54.5	Adhara	255 06.5 S29 00.0														
	04	96 14.9	287 04.5 56.2	237 43.7 00.6	56 54.0 52.7	122 59.6 54.6	Aldebaran	290 40.5 N16 33.5														
	05	111 17.3	302 04.5 55.5	252 44.5 01.2	71 56.8 52.6	138 02.1 54.6																
	06	126 19.8	317 04.5 N 4 54.7	267 45.3 S15 01.8	86 59.6 N13 52.5	153 04.6 S12 54.6	Alioth	166 14.4 N55 49.8														
	07	141 22.3	332 04.5 53.9	282 46.1 02.3	102 02.3 52.4	168 07.1 54.6	Alkaid	152 53.3 N49 11.7														
	08	156 24.7	347 04.5 53.1	297 46.8 02.9	117 05.1 52.3	183 09.6 54.6	Alnair	27 34.0 S46 50.9														
	09	171 27.2	2 04.5 52.3	312 47.6 03.4	132 07.9 52.2	198 12.1 54.6	Alnilam	275 38.5 S 1 11.1														
	10	186 29.6	17 04.5 51.5	327 48.4 04.0	147 10.7 52.1	213 14.6 54.6	Alphard	217 48.8 S 8 45.5														
	11	201 32.1	32 04.5 50.7	342 49.2 04.5	162 13.5 52.0	228 17.1 54.6																
	12	216 34.6	47 04.5 N 4 49.9	357 49.9 S15 05.1	177 16.3 N13 51.9	243 19.6 S12 54.6	Alphecca	126 05.0 N26 38.2														
	13	231 37.0	62 04.5 49.1	12 50.7 05.7	192 19.1 51.8	258 22.0 54.6	Alpheratz	357 35.5 N29 13.5														
	14	246 39.5	77 04.5 48.3	27 51.5 06.2	207 21.9 51.7	273 24.5 54.6	Altair	62 01.0 N 8 56.0														
	15	261 42.0	92 04.5 47.5	42 52.3 06.8	222 24.7 51.6	288 27.0 54.6	Ankaa	353 07.8 S42 10.7														
	16	276 44.4	107 04.5 46.7	57 53.0 07.3	237 27.5 51.5	303 29.5 54.6	Antares	112 17.4 S26 29.1														
	17	291 46.9	122 04.5 45.9	72 53.8 07.9	252 30.3 51.4	318 32.0 54.6																
	18	306 49.4	137 04.5 N 4 45.1	87 54.6 S15 08.4	267 33.1 N13 51.3	333 34.5 S12 54.6	Arcturus	145 49.2 N19 03.6														
	19	321 51.8	152 04.5 44.3	102 55.4 09.0	282 35.9 51.2	348 37.0 54.6	Atria	107 13.0 S69 04.3														
	20	336 54.3	167 04.5 43.5	117 56.1 09.6	297 38.7 51.1	3 39.5 54.7	Avior	234 15.1 S59 34.7														
	21	351 56.7	182 04.5 42.7	132 56.9 10.1	312 41.5 51.0	18 42.0 54.7	Bellatrix	278 23.7 N 6 22.4														
	22	6 59.2	197 04.5 41.9	147 57.7 10.7	327 44.3 50.9	33 44.5 54.7	Betelgeuse	270 53.0 N 7 24.8														
	23	22 01.7	212 04.5 41.1	162 58.5 11.2	342 47.1 50.8	48 47.0 54.7																
29	00	37 04.1	227 04.5 N 4 40.3	177 59.2 S15 11.8	357 49.8 N13 50.7	63 49.5 S12 54.7	Canopus	263 52.6 S52 42.1														
	01	52 06.6	242 04.5 39.5	193 00.0 12.3	12 52.6 50.6	78 52.0 54.7	Capella	280 23.1 N46 01.2														
	02	67 09.1	257 04.5 38.7	208 00.8 12.9	27 55.4 50.5	93 54.4 54.7	Deneb	49 26.5 N45 22.1														
	03	82 11.5	272 04.5 37.9	223 01.6 13.5	42 58.2 50.4	108 56.9 54.7	Denebola	182 26.2 N14 26.4														
	04	97 14.0	287 04.5 37.1	238 02.3 14.0	58 01.0 50.3	123 59.4 54.7	Diphda	348 48.0 S17 51.3														
	05	112 16.5	302 04.5 36.3	253 03.1 14.6	73 03.8 50.2	139 01.9 54.7																
	06	127 18.9	317 04.5 N 4 35.5	268 03.9 S15 15.1	88 06.6 N13 50.1	154 04.4 S12 54.7	Dubhe	193 42.6 N61 37.2														
	07	142 21.4	332 04.5 34.7	283 04.6 15.7	103 09.4 50.0	169 06.9 54.7	Elnath	278 02.9 N28 37.6														
	08	157 23.9	347 04.5 33.9	298 05.4 16.2	118 12.2 49.9	184 09.4 54.7	Eltanin	90 43.0 N51 29.3														
	09	172 26.3	2 04.5 33.1	313 06.2 16.8	133 15.0 49.8	199 11.9 54.7	Enif	33 39.7 N 9 59.1														
	10	187 28.8	17 04.5 32.3	328 07.0 17.3	148 17.8 49.7	214 14.4 54.7	Fomalhaut	15 15.4 S29 29.9														
	11	202 31.2	32 04.4 31.5	343 07.7 17.9	163 20.6 49.6	229 16.9 54.7																
	12	217 33.7	47 04.4 N 4 30.7	358 08.5 S15 18.4	178 23.4 N13 49.5	244 19.4 S12 54.7	Gacrux	171 53.3 S57 14.5														
	13	232 36.2	62 04.4 29.9	13 09.3 19.0	193 26.2 49.4	259 21.8 54.7	Gienah	175 44.9 S17 40.2														
	14	247 38.6	77 04.4 29.1	28 10.0 19.5	208 29.0 49.3	274 24.3 54.7	Hadar	148 38.2 S60 29.1														
	15	262 41.1	92 04.4 28.3	43 10.8 20.1	223 31.8 49.2	289 26.8 54.7	Hamal	327 52.0 N23 34.6														
	16	277 43.6	107 04.4 27.4	58 11.6 20.6	238 34.6 49.1	304 29.3 54.8	Kaus Aust.	83 34.1 S34 22.5														
	17	292 46.0	122 04.4 26.6	73 12.4 21.2	253 37.4 49.0	319 31.8 54.8																
	18	307 48.5	137 04.4 N 4 25.8	88 13.1 S15 21.8	268 40.2 N13 48.9	334 34.3 S12 54.8	Kochab	137 20.9 N74 03.5														
	19	322 51.0	152 04.4 25.0	103 13.9 22.3	283 42.9 48.8	349 36.8 54.8	Markab	13 30.7 N15 20.1														
	20	337 53.4	167 04.4 24.2	118 14.7 22.9	298 45.7 48.7	4 39.3 54.8	Menkar	314 06.9 N 4 11.1														
	21	352 55.9	182 04.4 23.4	133 15.4 23.4	313 48.5 48.6	19 41.8 54.8	Menkent	147 59.2 S36 29.1														
	22	7 58.4	197 04.3 22.6	148 16.2 24.0	328 51.3 48.5	34 44.2 54.8	Miaplacidus	221 38.7 S69 48.5														
	23	23 00.8	212 04.3 21.8	163 17.0 24.5	343 54.1 48.4	49 46.7 54.8																
30	00	38 03.3	227 04.3 N 4 20.9	178 17.7 S15 25.1	358 56.9 N13 48.3	64 49.2 S12 54.8	Mirfak	308 29.2 N49 56.7														
	01	53 05.7	242 04.3 20.1	193 18.5 25.6	13 59.7 48.1	79 51.7 54.8	Nunki	75 49.2 S26 16.1														
	02	68 08.2	257 04.3 19.3	208 19.3 26.2	29 02.5 48.0	94 54.2 54.8	Peacock	53 07.3 S56 39.7														
	03	83 10.7	272 04.3 18.5	223 20.0 26.7	44 05.3 47.9	109 56.7 54.8	Pollux	243 18.5 N27 58.1														
	04	98 13.1	287 04.3 17.7	238 20.8 27.3	59 08.1 47.8	124 59.2 54.8	Procyon	244 51.8 N 5 10.0														
	05	113 15.6	302 04.2 16.8	253 21.6 27.8	74 10.9 47.7	140 01.7 54.8																
	06	128 18.1	317 04.2 N 4 16.0	268 22.3 S15 28.4	89 13.7 N13 47.6	155 04.1 S12 54.8	Rasalhague	95 59.7 N12 32.7														
	07	143 20.5	332 04.2 15.2	283 23.1 28.9	104 16.5 47.5	170 06.6 54.8	Regulus	207 35.7 N11 51.2														
	08	158 23.0	347 04.2 14.4	298 23.9 29.5	119 19.3 47.4	185 09.1 54.8	Rigel	281 04.6 S 8 10.3														
	09	173 25.5	2 04.2 13.6	313 24.6 30.0	134 22.1 47.3	200 11.6 54.8	Rigel Kent.	139 42.4 S60 55.9														
	10	188 27.9	17 04.2 12.7	328 25.4 30.6	149 24.9 47.2	215 14.1 54.8	Sabik	102 04.2 S15 45.2														
	11	203 30.4	32 04.1 11.9	343 26.2 31.1	164 27.7 47.1	230 16.6 54.8																
	12	218 32.8	47 04.1 N 4 11.1	358 26.9 S15 31.7	179 30.5 N13 47.0	245 19.1 S12 54.8	Schedar	349 31.7 N56 40.2														
	13	233 35.3	62 04.1 10.3	13 27.7 32.2	194 33.3 46.9	260 21.5 54.8	Shaula	96 12.0 S37 07.3														
	14	248 37.8	77 04.1 09.5	28 28.5 32.8	209 36.1 46.8	275 24.0 54.8	Sirius	258 27.0 S16 44.7														
	15	263 40.2	92 04.1 08.6	43 29.2 33.3	224 38.9 46.7	290 26.5 54.8	Spica	158 23.7 S11 17.0														
	16	278 42.7	107 04.1 07.8	58 30.0 33.9	239 41.7 46.6	305 29.0 54.8	Suhail	222 47.2 S43 31.3														
	17	293 45.2	122 04.0 07.0	73 30.8 34.4	254 44.5 46.5	320 31.5 54.8																
	18	308 47.6	137 04.0 N 4 06.2	88 31.5 S15 34.9	269 47.2 N13 46.4	335 34.0 S12 54.8	Vega	80 34.1 N38 48.5														
	19	323 50.1	152 04.0 05.3	103 32.3 35.5	284 50.0 46.3	350 36.4 54.8	Zuben'ubi	136 57.5 S16 08.3														
	20	338 52.6	167 04.0 04.3	118 33.0 36.0	299 52.8 46.2	5 38.9 54.8																
	21	353 55.0	182 04.0 03.7	133 33.8 36.6	314 55.6 46.1	20 41.4 54.9																
	22	8 57.5	197 03.9 02.9	148 34.6 37.1	329 58.4 46.0	35 43.9 54.9	Venus	190 00.4 8 52														
	23	24 00.0	212 03.9 02.0	163 35.3 37.7	345 01.2 45.9	50 46.4 54.9	Mars	140 55.1 12 07														
															Jupiter	320 45.1 0 09						
															Saturn	26 45.3 19 41						
Mer. Pass. 21 28.2																						

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
										28	29		30	31		
	GHA	Dec	GHA	v	Dec	d	HP	Naut.							Civil	h m
d h	° / ' "	° / ' "	° / ' "		° / ' "			°	h m	h m	h m	h m	h m	h m	h m	h m
	N 72	05 53	07 14		08 37	14 38	12 47									
	N 70	05 50	07 03		08 14	15 00	14 03									
01	199 02.4	58.1	29 15.5	10.8	9 02.3	16.4	59.7	68	05 48	06 54	07 57	15 17	14 42			
02	214 02.5	58.9	43 45.3	10.8	9 18.7	16.3	59.7	66	05 46	06 46	07 43	15 31	15 09	14 27		
03	229 02.5	12 59.8	58 15.1	10.7	9 35.0	16.2	59.7	64	05 44	06 40	07 32	15 42	15 30	15 12		
04	244 02.6	13 00.6	72 44.8	10.7	9 51.2	16.2	59.7	62	05 42	06 34	07 22	15 52	15 47	15 42	15 36	15 36
05	259 02.6	01.4	87 14.5	10.7	10 07.4	16.1	59.6	60	05 40	06 29	07 14	16 00	16 02	16 05	16 14	16 14
SATURDAY	06	274 02.7	S13 02.3	101 44.2	10.6	N10 23.5	16.1	59.6	N 58	05 38	06 25	07 06	16 08	16 14	16 24	16 41
	07	289 02.8	03.1	116 13.8	10.6	10 39.6	16.0	59.6	56	05 37	06 21	07 00	16 15	16 25	16 39	17 02
	08	304 02.8	04.0	130 43.4	10.5	10 55.6	15.9	59.6	54	05 35	06 17	06 54	16 21	16 34	16 53	17 20
	09	319 02.9	.. 04.8	145 12.9	10.5	11 11.5	15.8	59.6	52	05 34	06 14	06 49	16 26	16 43	17 04	17 35
	10	334 02.9	05.6	159 42.4	10.5	11 27.3	15.8	59.5	50	05 32	06 10	06 44	16 31	16 50	17 15	17 48
	11	349 03.0	06.5	174 11.9	10.4	11 43.1	15.7	59.5	45	05 29	06 03	06 34	16 42	17 07	17 37	18 15
	12	4 03.0	S13 07.3	188 41.3	10.4	N11 58.8	15.6	59.5	N 40	05 25	05 57	06 25	16 51	17 20	17 55	18 36
	13	19 03.1	08.1	203 10.7	10.4	12 14.4	15.5	59.5	35	05 22	05 52	06 18	16 58	17 32	18 10	18 54
	14	34 03.1	09.0	217 40.1	10.3	12 29.9	15.5	59.5	30	05 19	05 47	06 11	17 05	17 42	18 23	19 10
	15	49 03.2	.. 09.8	232 09.4	10.2	12 45.4	15.4	59.4	20	05 11	05 37	06 00	17 17	17 59	18 46	19 36
	16	64 03.2	10.6	246 38.6	10.3	13 00.8	15.3	59.4	N 10	05 03	05 28	05 50	17 27	18 15	19 05	19 59
	17	79 03.3	11.5	261 07.9	10.1	13 16.1	15.2	59.4	0	04 54	05 19	05 40	17 37	18 30	19 24	20 20
	18	94 03.3	S13 12.3	275 37.0	10.2	N13 31.3	15.2	59.4	S 10	04 44	05 09	05 31	17 47	18 44	19 42	20 41
	19	109 03.4	13.1	290 06.2	10.0	13 46.5	15.0	59.3	20	04 31	04 57	05 20	17 58	19 00	20 02	21 04
	20	124 03.4	14.0	304 35.2	10.1	14 01.5	15.0	59.3	30	04 13	04 43	05 08	18 11	19 18	20 26	21 31
	21	139 03.5	.. 14.8	319 04.3	10.0	14 16.5	14.8	59.3	35	04 03	04 35	05 01	18 18	19 29	20 39	21 47
	22	154 03.5	15.6	333 33.3	9.9	14 31.3	14.8	59.3	40	03 50	04 24	04 53	18 26	19 41	20 55	22 05
	23	169 03.6	16.5	348 02.2	9.9	14 46.1	14.7	59.2	45	03 33	04 12	04 44	18 36	19 56	21 14	22 28
SUNDAY	00	184 03.6	S13 17.3	2 31.1	9.8	N15 00.8	14.6	59.2	S 50	03 12	03 57	04 32	18 48	20 14	21 38	22 56
	01	199 03.6	18.1	16 59.9	9.8	15 15.4	14.5	59.2	52	03 01	03 50	04 27	18 53	20 23	21 50	23 11
	02	214 03.7	19.0	31 28.7	9.8	15 29.9	14.4	59.2	54	02 49	03 41	04 21	19 00	20 32	22 03	23 27
	03	229 03.7	.. 19.8	45 57.5	9.7	15 44.3	14.3	59.2	56	02 35	03 32	04 15	19 06	20 43	22 19	23 46
	04	244 03.8	20.6	60 26.2	9.6	15 58.6	14.2	59.1	58	02 18	03 21	04 07	19 14	20 56	22 37	24 11
	05	259 03.8	21.5	74 54.8	9.6	16 12.8	14.1	59.1	S 60	01 56	03 09	03 59	19 23	21 10	22 59	24 43
	06	274 03.9	S13 22.3	89 23.4	9.6	N16 26.9	14.0	59.1	Lat.	Sunset	Twilight		Moonset			
	07	289 03.9	23.1	103 52.0	9.4	16 40.9	13.8	59.0			Civil	Naut.	28	29	30	31
	08	304 04.0	24.0	118 20.4	9.5	16 54.7	13.8	59.0								
	09	319 04.0	.. 24.8	132 48.9	9.4	17 08.5	13.7	59.0	h m	h m	h m	h m	h m	h m	h m	h m
	10	334 04.1	25.6	147 17.3	9.3	17 22.2	13.6	59.0								
	11	349 04.1	26.4	161 45.6	9.3	17 35.8	13.4	58.9								
	12	4 04.1	S13 27.3	176 13.9	9.2	N17 49.2	13.4	58.9	N 72	14 49	16 11	17 33	07 38	11 19		
	13	19 04.2	28.1	190 42.1	9.2	18 02.6	13.2	58.9	N 70	15 12	16 23	17 35	07 19	10 05		
	14	34 04.2	28.9	205 10.3	9.1	18 15.8	13.1	58.9	68	15 29	16 32	17 38	07 05	09 28		
	15	49 04.3	.. 29.8	219 38.4	9.1	18 28.9	13.0	58.8	66	15 43	16 40	17 40	06 53	09 02	11 37	
	16	64 04.3	30.6	234 06.5	9.0	18 41.9	12.9	58.8	64	15 55	16 46	17 42	06 43	08 42	10 52	
	17	79 04.4	31.4	248 34.5	9.0	18 54.8	12.7	58.8	62	16 04	16 52	17 44	06 35	08 27	10 23	12 26
18	94 04.4	S13 32.2	263 02.5	8.9	N19 07.5	12.7	58.7	60	16 13	16 57	17 46	06 28	08 13	10 01	11 48	
19	109 04.4	33.1	277 30.4	8.8	19 20.2	12.5	58.7	N 58	16 20	17 02	17 48	06 21	08 02	09 43	11 22	
20	124 04.5	33.9	291 58.2	8.8	19 32.7	12.4	58.7	56	16 27	17 06	17 50	06 16	07 52	09 28	11 01	
21	139 04.5	.. 34.7	306 26.0	8.8	19 45.1	12.3	58.7	54	16 33	17 10	17 51	06 11	07 43	09 16	10 44	
22	154 04.6	35.5	320 53.8	8.7	19 57.4	12.1	58.6	52	16 38	17 13	17 53	06 07	07 36	09 04	10 29	
23	169 04.6	36.4	335 21.5	8.6	20 09.5	12.0	58.6	50	16 43	17 16	17 54	06 03	07 29	08 54	10 16	
MONDAY	00	184 04.6	S13 37.2	349 49.1	8.6	N20 21.5	11.9	58.6	45	16 53	17 23	17 58	05 54	07 14	08 34	09 50
	01	199 04.7	38.0	4 16.7	8.5	20 33.4	11.8	58.5	N 40	17 02	17 30	18 01	05 47	07 02	08 17	09 29
	02	214 04.7	38.8	18 44.2	8.5	20 45.2	11.6	58.5	35	17 09	17 35	18 05	05 41	06 52	08 03	09 12
	03	229 04.7	.. 39.6	33 11.7	8.5	20 56.8	11.5	58.5	30	17 16	17 40	18 08	05 36	06 43	07 51	08 57
	04	244 04.8	40.5	47 39.2	8.3	21 08.3	11.4	58.4	20	17 27	17 50	18 16	05 26	06 28	07 30	08 32
	05	259 04.8	41.3	62 06.5	8.4	21 19.7	11.2	58.4	N 10	17 37	17 59	18 24	05 18	06 14	07 12	08 11
	06	274 04.9	S13 42.1	76 33.9	8.3	N21 30.9	11.1	58.4	0	17 47	18 08	18 33	05 11	06 02	06 55	07 50
	07	289 04.9	42.9	91 01.2	8.2	21 42.0	10.9	58.3	S 10	17 57	18 19	18 44	05 03	05 50	06 38	07 30
	08	304 04.9	43.8	105 28.4	8.2	21 52.9	10.9	58.3	20	18 07	18 30	18 57	04 55	05 36	06 21	07 09
	09	319 05.0	.. 44.6	119 55.6	8.1	22 03.8	10.6	58.3	30	18 20	18 45	19 15	04 46	05 21	06 00	06 44
	10	334 05.0	45.4	134 22.7	8.1	22 14.4	10.6	58.3	35	18 27	18 54	19 26	04 41	05 13	05 49	06 30
	11	349 05.0	46.2	148 49.8	8.0	22 25.0	10.4	58.2	40	18 35	19 04	19 39	04 35	05 03	05 35	06 13
	12	4 05.1	S13 47.0	163 16.8	8.0	N22 35.4	10.3	58.2	45	18 44	19 16	19 55	04 28	04 52	05 19	05 53
	13	19 05.1	47.8	177 43.8	8.0	22 45.7	10.1	58.2	S 50	18 56	19 32	20 17	04 20	04 38	05 00	05 28
	14	34 05.1	48.7	192 10.8	7.9	22 55.8	9.9	58.1	52	19 01	19 39	20 28	04 17	04 32	04 50	05 16
	15	49 05.2	.. 49.5	206 37.7	7.8	23 05.7	9.9	58.1	54	19 07	19 48	20 40	04 13	04 24	04 40	05 02
	16	64 05.2	50.3	221 04.5	7.8	23 15.6	9.7	58.1	56	19 14	19 57	20 55	04 08	04 17	04 28	04 46
	17	79 05.2	51.1	235 31.3	7.8	23 25.3	9.5	58.0	58	19 22	20 08	21 13	04 03	04 08	04 15	04 28
18	94 05.3	S13 51.9	249 58.1	7.7	N23 34.8	9.4	58.0	S 60	19 30	20 21	21 35	03 58	03 58	04 00	04 05	
19	109 05.3	52.8	264 24.8	7.7	23 44.2	9.2	58.0	Day	SUN		MOON					
20	124 05.3	53.6	278 51.5	7.6	23 53.4	9.1	57.9		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
21	139 05.4	.. 54.4	293 18.1	7.6	24 02.5	9.0	57.9		00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
22	154 05.4	55.2	307 44.7	7.5	24 11.5	8.8	57.9	d	m s	m s	h m	h m	h m	d	%	
23	169 05.4	56.0	322 11.2	7.5	N24 20.3	8.6	57.8	28	16 09	16 12	11 44	23 50	11 24	14 100		
	SD	16.1	d	0.8	SD	16.2	16.1	29	16 14	16 16	11 44	24 42	12 16	15 99		
								30	16 18	16 20	11 44	00 42	13 09	16 97		

UT		ARIES		VENUS −4.4		MARS +1.5		JUPITER −2.9		SATURN +0.7		STARS		
d h	m	GHA		GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
		° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
TUESDAY	00	39 02.4	227 03.9 N 4 01.2	178 36.1 S15 38.2	0 04.0 N13 45.8	65 48.9 S12 54.9	Acamar	315 12.1 S40 12.5						
	01	54 04.9	242 03.9 4 00.4	193 36.9 38.8	15 06.8 45.7	80 51.4 54.9	Achernar	335 20.3 S57 07.0						
	02	69 07.3	257 03.8 3 59.5	208 37.6 39.3	30 09.6 45.6	95 53.8 54.9	Acrux	173 01.8 S63 13.6						
	03	84 09.8	272 03.8 58.7	223 38.4 39.9	45 12.4 45.5	110 56.3 54.9	Adhara	255 06.5 S29 00.0						
	04	99 12.3	287 03.8 57.9	238 39.1 40.4	60 15.2 45.4	125 58.8 54.9	Aldebaran	290 40.5 N16 33.5						
	05	114 14.7	302 03.8 57.0	253 39.9 41.0	75 18.0 45.3	141 01.3 54.9								
	06	129 17.2	317 03.7 N 3 56.2	268 40.7 S15 41.5	90 20.8 N13 45.2	156 03.8 S12 54.9	Alioth	166 14.4 N55 49.8						
	07	144 19.7	332 03.7 55.4	283 41.4 42.1	105 23.6 45.1	171 06.2 54.9	Alkaid	152 53.3 N49 11.7						
	08	159 22.1	347 03.7 54.5	298 42.2 42.6	120 26.4 45.0	186 08.7 54.9	Alnair	27 34.0 S46 50.9						
	09	174 24.6	2 03.7 53.7	313 42.9 43.1	135 29.2 44.9	201 11.2 54.9	Alnilam	275 38.5 S 1 11.1						
	10	189 27.1	17 03.6 52.9	328 43.7 43.7	150 32.0 44.8	216 13.7 54.9	Alphard	217 48.8 S 8 45.5						
	11	204 29.5	32 03.6 52.0	343 44.5 44.2	165 34.8 44.7	231 16.2 54.9								
	12	219 32.0	47 03.6 N 3 51.2	358 45.2 S15 44.8	180 37.6 N13 44.6	246 18.7 S12 54.9	Alphecca	126 05.0 N26 38.2						
	13	234 34.5	62 03.5 50.4	13 46.0 45.3	195 40.4 44.5	261 21.1 54.9	Alpheratz	357 35.5 N29 13.5						
	14	249 36.9	77 03.5 49.5	28 46.7 45.9	210 43.2 44.4	276 23.6 54.9	Altair	62 01.0 N 8 56.0						
	15	264 39.4	92 03.5 48.7	43 47.5 46.4	225 46.0 44.3	291 26.1 54.9	Ankaa	353 07.8 S42 10.7						
	16	279 41.8	107 03.5 47.8	58 48.3 46.9	240 48.8 44.2	306 28.6 54.9	Antares	112 17.4 S26 29.0						
	17	294 44.3	122 03.4 47.0	73 49.0 47.5	255 51.6 44.1	321 31.1 54.9								
	18	309 46.8	137 03.4 N 3 46.2	88 49.8 S15 48.0	270 54.4 N13 44.0	336 33.5 S12 54.9	Arcturus	145 49.2 N19 03.6						
	19	324 49.2	152 03.4 45.3	103 50.5 48.6	285 57.2 43.9	351 36.0 54.9	Atria	107 13.0 S69 04.3						
	20	339 51.7	167 03.3 44.5	118 51.3 49.1	301 00.0 43.8	6 38.5 54.9	Avior	234 15.1 S59 34.7						
	21	354 54.2	182 03.3 43.7	133 52.0 49.7	316 02.8 43.6	21 41.0 54.9	Bellatrix	278 23.7 N 6 22.4						
	22	9 56.6	197 03.3 42.8	148 52.8 50.2	331 05.6 43.5	36 43.5 54.9	Betelgeuse	270 53.0 N 7 24.8						
	23	24 59.1	212 03.2 42.0	163 53.6 50.7	346 08.4 43.4	51 45.9 54.9								
WEDNESDAY	00	40 01.6	227 03.2 N 3 41.1	178 54.3 S15 51.3	1 11.1 N13 43.3	66 48.4 S12 54.9	Canopus	263 52.5 S52 42.2						
	01	55 04.0	242 03.2 40.3	193 55.1 51.8	16 13.9 43.2	81 50.9 54.9	Capella	280 23.0 N46 01.2						
	02	70 06.5	257 03.1 39.4	208 55.8 52.4	31 16.7 43.1	96 53.4 54.9	Deneb	49 26.5 N45 22.2						
	03	85 09.0	272 03.1 38.6	223 56.6 52.9	46 19.5 43.0	111 55.9 54.9	Denebola	182 26.2 N14 26.4						
	04	100 11.4	287 03.1 37.7	238 57.3 53.5	61 22.3 42.9	126 58.3 54.9	Diphda	348 48.0 S17 51.3						
	05	115 13.9	302 03.0 36.9	253 58.1 54.0	76 25.1 42.8	142 00.8 54.9								
	06	130 16.3	317 03.0 N 3 36.1	268 58.9 S15 54.5	91 27.9 N13 42.7	157 03.3 S12 54.9	Dubhe	193 42.6 N61 37.2						
	07	145 18.8	332 03.0 35.2	283 59.6 55.1	106 30.7 42.6	172 05.8 54.9	Elmath	278 02.9 N28 37.6						
	08	160 21.3	347 02.9 34.4	299 00.4 55.6	121 33.5 42.5	187 08.3 54.9	Eltanin	90 43.0 N51 29.3						
	09	175 23.7	2 02.9 33.5	314 01.1 56.2	136 36.3 42.4	202 10.7 54.9	Enif	33 39.7 N 9 59.2						
	10	190 26.2	17 02.9 32.7	329 01.9 56.7	151 39.1 42.3	217 13.2 54.9	Fomalhaut	15 15.4 S29 29.9						
	11	205 28.7	32 02.8 31.8	344 02.6 57.2	166 41.9 42.2	232 15.7 54.9								
	12	220 31.1	47 02.8 N 3 31.0	359 03.4 S15 57.8	181 44.7 N13 42.1	247 18.2 S12 54.9	Gacrux	171 53.3 S57 14.5						
	13	235 33.6	62 02.7 30.1	14 04.1 58.3	196 47.5 42.0	262 20.6 54.9	Gienah	175 44.9 S17 40.2						
	14	250 36.1	77 02.7 29.3	29 04.9 58.9	211 50.3 41.9	277 23.1 54.9	Hadar	148 38.1 S60 29.1						
	15	265 38.5	92 02.7 28.4	44 05.6 59.4	226 53.1 41.8	292 25.6 54.9	Hamal	327 52.0 N23 34.6						
	16	280 41.0	107 02.6 27.6	59 06.4 15 59.9	241 55.9 41.7	307 28.1 54.9	Kaus Aust.	83 34.1 S34 22.5						
	17	295 43.5	122 02.6 26.7	74 07.1 16 00.5	256 58.7 41.6	322 30.5 54.9								
	18	310 45.9	137 02.5 N 3 25.9	89 07.9 S16 01.0	272 01.5 N13 41.5	337 33.0 S12 54.9	Kochab	137 20.9 N74 03.5						
	19	325 48.4	152 02.5 25.0	104 08.6 01.5	287 04.3 41.4	352 35.5 54.9	Markab	13 30.7 N15 20.1						
	20	340 50.8	167 02.5 24.2	119 09.4 02.1	302 07.1 41.3	7 38.0 54.9	Menkar	314 06.9 N 4 11.1						
	21	355 53.3	182 02.4 23.3	134 10.2 02.6	317 09.9 41.2	22 40.5 54.9	Menkent	147 59.2 S36 29.1						
	22	10 55.8	197 02.4 22.5	149 10.9 03.2	332 12.7 41.1	37 42.9 54.9	Miaplacidus	221 38.6 S69 48.5						
	23	25 58.2	212 02.3 21.6	164 11.7 03.7	347 15.5 41.0	52 45.4 54.9								
THURSDAY	00	41 00.7	227 02.3 N 3 20.7	179 12.4 S16 04.2	2 18.3 N13 40.9	67 47.9 S12 54.9	Mirfak	308 29.2 N49 56.7						
	01	56 03.2	242 02.3 19.9	194 13.2 04.8	17 21.1 40.8	82 50.4 54.9	Nunki	75 49.2 S26 16.1						
	02	71 05.6	257 02.2 19.0	209 13.9 05.3	32 23.9 40.7	97 52.8 54.9	Peacock	53 07.4 S56 39.7						
	03	86 08.1	272 02.2 18.2	224 14.7 05.8	47 26.7 40.6	112 55.3 54.9	Pollux	243 18.5 N27 58.1						
	04	101 10.6	287 02.1 17.3	239 15.4 06.4	62 29.5 40.5	127 57.8 54.9	Procyon	244 51.8 N 5 10.0						
	05	116 13.0	302 02.1 16.5	254 16.2 06.9	77 32.3 40.4	143 00.3 54.9								
	06	131 15.5	317 02.0 N 3 15.6	269 16.9 S16 07.5	92 35.1 N13 40.3	158 02.7 S12 54.9	Rasalhague	95 59.7 N12 32.7						
	07	146 17.9	332 02.0 14.7	284 17.7 08.0	107 37.9 40.2	173 05.2 54.9	Regulus	207 35.6 N11 51.1						
	08	161 20.4	347 01.9 13.9	299 18.4 08.5	122 40.7 40.1	188 07.7 54.9	Rigel	281 04.6 S 8 10.3						
	09	176 22.9	2 01.9 13.0	314 19.2 09.1	137 43.5 40.0	203 10.2 54.9	Rigel Kent.	139 42.4 S60 55.9						
	10	191 25.3	17 01.9 12.2	329 19.9 09.6	152 46.3 39.9	218 12.6 54.9	Sabik	102 04.2 S15 45.2						
	11	206 27.8	32 01.8 11.3	344 20.6 10.1	167 49.1 39.8	233 15.1 54.9								
	12	221 30.3	47 01.8 N 3 10.4	359 21.4 S16 10.7	182 51.9 N13 39.7	248 17.6 S12 54.9	Schedar	349 31.7 N56 40.2						
	13	236 32.7	62 01.7 09.6	14 22.1 11.2	197 54.6 39.5	263 20.0 54.9	Shaula	96 12.1 S37 07.3						
	14	251 35.2	77 01.7 08.7	29 22.9 11.7	212 57.4 39.4	278 22.5 54.9	Sirius	258 27.0 S16 44.7						
	15	266 37.7	92 01.6 07.8	44 23.6 12.3	228 00.2 39.3	293 25.0 54.9	Spica	158 23.7 S11 17.0						
	16	281 40.1	107 01.6 07.0	59 24.4 12.8	243 03.0 39.2	308 27.5 54.9	Suhail	222 47.1 S43 31.3						
	17	296 42.6	122 01.5 06.1	74 25.1 13.3	258 05.8 39.1	323 29.9 54.9								
	18	311 45.1	137 01.5 N 3 05.3	89 25.9 S16 13.9	273 08.6 N13 39.0	338 32.4 S12 54.9	Vega	80 34.1 N38 48.5						
	19	326 47.5	152 01.4 04.4	104 26.6 14.4	288 11.4 38.9	353 34.9 54.9	Zuben'ubi	136 57.5 S16 08.3						
	20	341 50.0	167 01.4 03.5	119 27.4 14.9	303 14.2 38.8	8 37.4 54.9								
	21	356 52.4	182 01.3 02.7	134 28.1 15.5	318 17.0 38.7	23 39.8 54.9								
	22	11 54.9	197 01.3 01.8	149 28.9 16.0	333 19.8 38.6	38 42.3 54.9								
	23	26 57.4	212 01.2 00.9	164 29.6 16.5	348 22.6 38.5	53 44.8 54.9								
h m		v 0.0 d 0.8		v 0.8 d 0.5		v 2.8 d 0.1		v 2.5 d 0.0						
Mer. Pass. 21 16.4														

UT	SUN		MOON					Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	v	Dec	d	HP		Naut.	Civil		31	1	2	3		
d h	° ' "	° ' "	° ' "	' "	° ' "	' "	' "	°	h m	h m	h m	h m	h m	h m	h m	h m	
31	00	184 05.5 S13 56.8	336 37.7	7.5	N24 28.9	8.5	57.8	N 72	06 05	07 28	08 55						
	01	199 05.5 57.6	351 04.2	7.5	24 37.4	8.3	57.8	N 70	06 01	07 15	08 29						
	02	214 05.5 58.5	5 30.7	7.4	24 45.7	8.2	57.7	68	05 57	07 05	08 09						
	03	229 05.6 13 59.3	19 57.1	7.3	24 53.9	8.0	57.7	66	05 54	06 56	07 54						
	04	244 05.6 14 00.1	34 23.4	7.4	25 01.9	7.9	57.7	64	05 52	06 48	07 41						
TUESDAY	05	259 05.6 00.9	48 49.8	7.3	25 09.8	7.7	57.6	62	05 49	06 42	07 31	15 36	15 21		18 15		
	06	274 05.7 S14 01.7	63 16.1	7.3	N25 17.5	7.6	57.6	60	05 47	06 36	07 21	16 14	16 38	17 33	18 57		
	07	289 05.7 02.5	77 42.4	7.2	25 25.1	7.4	57.6	N 58	05 45	06 31	07 13	16 41	17 14	18 10	19 26		
	08	304 05.7 03.3	92 08.6	7.2	25 32.5	7.2	57.5	56	05 43	06 27	07 06	17 02	17 40	18 36	19 48		
	09	319 05.7 . . 04.1	106 34.8	7.2	25 39.7	7.1	57.5	54	05 41	06 22	07 00	17 20	18 00	18 56	20 06		
	10	334 05.8 05.0	121 01.0	7.2	25 46.8	6.9	57.5	52	05 39	06 19	06 54	17 35	18 17	19 14	20 21		
	11	349 05.8 05.8	135 27.2	7.1	25 53.7	6.8	57.4	50	05 37	06 15	06 49	17 48	18 32	19 29	20 34		
	12	4 05.8 S14 06.6	149 53.3	7.1	N26 00.5	6.6	57.4	45	05 33	06 07	06 38	18 15	19 02	19 58	21 01		
	13	19 05.8 07.4	164 19.4	7.1	26 07.1	6.4	57.4	N 40	05 29	06 01	06 29	18 36	19 26	20 22	21 23		
	14	34 05.9 08.2	178 45.5	7.1	26 13.5	6.3	57.3	35	05 25	05 54	06 21	18 54	19 45	20 41	21 40		
	15	49 05.9 . . 09.0	193 11.6	7.0	26 19.8	6.1	57.3	30	05 21	05 49	06 14	19 10	20 02	20 58	21 56		
	16	64 05.9 09.8	207 37.6	7.0	26 25.9	6.0	57.3	20	05 12	05 39	06 01	19 36	20 30	21 25	22 21		
	17	79 05.9 10.6	222 03.6	7.1	26 31.9	5.8	57.2	N 10	05 04	05 29	05 50	19 59	20 54	21 49	22 44		
	18	94 06.0 S14 11.4	236 29.7	7.0	N26 37.7	5.6	57.2	0	04 54	05 19	05 40	20 20	21 16	22 12	23 04		
	19	109 06.0 12.2	250 55.7	6.9	26 43.3	5.5	57.2	S 10	04 43	05 08	05 30	20 41	21 39	22 34	23 25		
	20	124 06.0 13.0	265 21.6	7.0	26 48.8	5.3	57.1	20	04 29	04 56	05 19	21 04	22 03	22 58	23 47		
	21	139 06.0 . . 13.8	279 47.6	7.0	26 54.1	5.2	57.1	30	04 10	04 40	05 06	21 31	22 32	23 26	24 12		
	22	154 06.1 14.6	294 13.6	6.9	26 59.3	5.0	57.1	35	03 59	04 31	04 58	21 47	22 48	23 42	24 27		
	23	169 06.1 15.5	308 39.5	7.0	27 04.3	4.8	57.0	40	03 45	04 20	04 49	22 05	23 08	24 01	00 01		
	1	00	184 06.1 S14 16.3	323 05.5	6.9	N27 09.1	4.6	57.0	S 50	03 05	03 51	04 27	22 56	24 03	00 03	00 54	
		01	199 06.1 17.1	337 31.4	7.0	27 13.7	4.5	57.0	52	02 54	03 43	04 21	23 11	24 18	00 18	01 08	
		02	214 06.2 17.9	351 57.4	6.9	27 18.2	4.4	56.9	54	02 41	03 34	04 15	23 27	24 36	00 36	01 25	
		03	229 06.2 . . 18.7	6 23.3	7.0	27 22.6	4.1	56.9	56	02 25	03 24	04 08	23 46	24 57	00 57	01 45	
		04	244 06.2 19.5	20 49.3	6.9	27 26.7	4.0	56.9	58	02 06	03 13	04 00	24 11	00 11	01 25	02 11	
WEDNESDAY	05	259 06.2 20.3	35 15.2	6.9	27 30.7	3.9	56.8	S 60	01 42	02 59	03 51	24 43	00 43	02 05	02 45		
	06	274 06.2 S14 21.1	49 41.1	7.0	N27 34.6	3.7	56.8		Lat.	Sunset	Twilight		Moonset				
	07	289 06.3 21.9	64 07.1	6.9	27 38.3	3.5	56.8				Civil	Naut.	31	1	2	3	
	08	304 06.3 22.7	78 33.0	7.0	27 41.8	3.3	56.7										
	09	319 06.3 . . 23.5	92 59.0	6.9	27 45.1	3.2	56.7										
	10	334 06.3 24.3	107 24.9	7.0	27 48.3	3.0	56.7										
	11	349 06.3 25.1	121 50.9	7.0	27 51.3	2.9	56.6	N 72	14 31	15 58	17 20						
	12	4 06.4 S14 25.9	136 16.9	7.0	N27 54.2	2.7	56.6	N 70	14 57	16 11	17 25						
	13	19 06.4 26.7	150 42.9	7.0	27 56.9	2.5	56.6	68	15 16	16 21	17 28						
	14	34 06.4 27.5	165 08.9	7.1	27 59.4	2.4	56.5	66	15 32	16 30	17 31						
	15	49 06.4 . . 28.3	179 35.0	7.0	28 01.8	2.2	56.5	64	15 45	16 38	17 34						
	16	64 06.4 29.1	194 01.0	7.1	28 04.0	2.0	56.5	62	15 56	16 44	17 37	12 26	14 40		15 33		
	17	79 06.4 29.9	208 27.1	7.1	28 06.0	1.9	56.4	60	16 05	16 50	17 39	11 48	13 23	14 24	14 51		
	18	94 06.5 S14 30.7	222 53.2	7.1	N28 07.9	1.7	56.4	N 58	16 13	16 55	17 42	11 22	12 47	13 47	14 22		
	19	109 06.5 31.5	237 19.3	7.1	28 09.6	1.6	56.4	56	16 20	17 00	17 44	11 01	12 21	13 21	13 59		
	20	124 06.5 32.3	251 45.4	7.2	28 11.2	1.4	56.3	54	16 26	17 04	17 46	10 44	12 01	13 00	13 41		
	21	139 06.5 . . 33.1	266 11.6	7.2	28 12.6	1.2	56.3	52	16 32	17 08	17 48	10 29	11 44	12 43	13 26		
	22	154 06.5 33.9	280 37.8	7.3	28 13.8	1.1	56.3	50	16 37	17 11	17 49	10 16	11 29	12 28	13 12		
	23	169 06.5 34.7	295 04.1	7.2	28 14.9	0.9	56.2	45	16 49	17 19	17 54	09 50	10 59	11 58	12 44		
	2	00	184 06.6 S14 35.5	309 30.3	7.3	N28 15.8	0.7	56.2	N 40	16 58	17 26	17 58	09 29	10 36	11 34	12 22	
		01	199 06.6 36.3	323 56.6	7.4	28 16.5	0.6	56.2	35	17 06	17 32	18 02	09 12	10 17	11 15	12 04	
		02	214 06.6 37.1	338 23.0	7.3	28 17.1	0.5	56.1	30	17 13	17 38	18 06	08 57	10 01	10 58	11 49	
		03	229 06.6 . . 37.8	352 49.3	7.4	28 17.6	0.2	56.1	20	17 26	17 48	18 14	08 32	09 33	10 30	11 22	
		04	244 06.6 38.6	7 15.7	7.5	28 17.8	0.1	56.1	N 10	17 37	17 58	18 23	08 11	09 09	10 06	10 59	
THURSDAY	05	259 06.6 39.4	21 42.2	7.5	28 17.9	0.0	56.0	0	17 47	18 08	18 33	07 50	08 47	09 43	10 37		
	06	274 06.6 S14 40.2	36 08.7	7.5	N28 17.9	0.2	56.0	S 10	17 58	18 19	18 45	07 30	08 25	09 21	10 16		
	07	289 06.6 41.0	50 35.2	7.6	28 17.7	0.3	56.0	20	18 09	18 32	18 59	07 09	08 01	08 56	09 52		
	08	304 06.7 41.8	65 01.8	7.6	28 17.4	0.6	56.0	30	18 22	18 47	19 17	06 44	07 34	08 28	09 25		
	09	319 06.7 . . 42.6	79 28.4	7.7	28 16.8	0.6	55.9	35	18 30	18 57	19 29	06 30	07 17	08 11	09 09		
	10	334 06.7 43.4	93 55.1	7.7	28 16.2	0.8	55.9	40	18 38	19 08	19 43	06 13	06 58	07 51	08 51		
	11	349 06.7 44.2	108 21.8	7.8	28 15.4	1.0	55.9	45	18 49	19 21	20 01	05 53	06 36	07 28	08 28		
	12	4 06.7 S14 45.0	122 48.6	7.8	N28 14.4	1.1	55.8	S 50	19 01	19 38	20 24	05 28	06 06	06 57	07 59		
	13	19 06.7 45.8	137 15.4	7.9	28 13.3	1.3	55.8	52	19 07	19 45	20 35	05 16	05 52	06 42	07 44		
	14	34 06.7 46.6	151 42.3	7.9	28 12.0	1.5	55.8	54	19 13	19 54	20 49	05 02	05 35	06 24	07 28		
	15	49 06.7 . . 47.4	166 09.2	8.0	28 10.5	1.5	55.8	56	19 21	20 05	21 05	04 46	05 16	06 02	07 08		
	16	64 06.7 48.1	180 36.2	8.0	28 09.0	1.8	55.7	58	19 29	20 17	21 24	04 28	04 51	05 35	06 43		
	17	79 06.7 48.9	195 03.2	8.1	28 07.2	1.8	55.7	S 60	19 38	20 30	21 50	04 05	04 18	04 55	06 08		
	18	94 06.7 S14 49.7	209 30.3	8.2	N28 05.4	2.1	55.7		SUN			MOON					
	19	109 06.8 50.5	223 57.5	8.2	28 03.3	2.2	55.6	Day	Eqn. of Time	Mer.		Mer. Pass.		Age	Phase		
	20	124 06.8 51.3	238 24.7	8.3	28 01.1	2.3	55.6		00 ^h	12 ^h	Pass.	Upper	Lower				
	21	139 06.8 . . 52.1	252 52.0	8.4	27 58.8	2.5	55.6		d	m s	m s	h m	h m	h m	d	%	
	22	154 06.8 52.9															

UT		ARIES		VENUS −4.4		MARS +1.4		JUPITER −2.9		SATURN +0.7		STARS			
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
d h		° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "		° ' "	° ' "
F R I D A Y	3 00	41 59.8	227 01.2 N	3 00.1	179 30.3	S16 17.1	3 25.4	N13 38.4	68 47.2	S12 54.9	Acamar	315 12.1	S40 12.5		
	01	57 02.3	242 01.1	2 59.2	194 31.1	17.6	18 28.2	38.3	83 49.7	54.9	Achernar	335 20.3	S57 07.0		
	02	72 04.8	257 01.1	58.3	209 31.8	18.1	33 31.0	38.2	98 52.2	54.8	Acrux	173 01.8	S63 13.6		
	03	87 07.2	272 01.0	57.4	224 32.6	18.7	48 33.8	38.1	113 54.7	54.8	Adhara	255 06.5	S29 00.0		
	04	102 09.7	287 00.9	56.6	239 33.3	19.2	63 36.6	38.0	128 57.1	54.8	Aldebaran	290 40.5	N16 33.5		
	05	117 12.2	302 00.9	55.7	254 34.1	19.7	78 39.4	37.9	143 59.6	54.8					
	06	132 14.6	317 00.8 N	2 54.8	269 34.8	S16 20.3	93 42.2	N13 37.8	159 02.1	S12 54.8	Alioth	166 14.3	N55 49.8		
	07	147 17.1	332 00.8	54.0	284 35.6	20.8	108 45.0	37.7	174 04.5	54.8	Alkaid	152 53.3	N49 11.7		
	08	162 19.6	347 00.7	53.1	299 36.3	21.3	123 47.8	37.6	189 07.0	54.8	Alnair	27 34.0	S46 50.9		
	09	177 22.0	2 00.7	52.2	314 37.0	21.8	138 50.6	37.5	204 09.5	54.8	Alnilam	275 38.5	S 1 11.1		
	10	192 24.5	17 00.6	51.3	329 37.8	22.4	153 53.4	37.4	219 11.9	54.8	Alphard	217 48.8	S 8 45.5		
	11	207 26.9	32 00.6	50.5	344 38.5	22.9	168 56.2	37.3	234 14.4	54.8					
	12	222 29.4	47 00.5 N	2 49.6	359 39.3	S16 23.4	183 59.0	N13 37.2	249 16.9	S12 54.8	Alphecca	126 05.0	N26 38.2		
	13	237 31.9	62 00.4	48.7	14 40.0	24.0	199 01.8	37.1	264 19.4	54.8	Alpheratz	357 35.5	N29 13.5		
	14	252 34.3	77 00.4	47.9	29 40.8	24.5	214 04.6	37.0	279 21.8	54.8	Altair	62 01.0	N 8 56.0		
	15	267 36.8	92 00.3	47.0	44 41.5	25.0	229 07.4	36.9	294 24.3	54.8	Ankaa	353 07.8	S42 10.7		
	16	282 39.3	107 00.3	46.1	59 42.2	25.6	244 10.2	36.8	309 26.8	54.8	Antares	112 17.4	S26 29.0		
	17	297 41.7	122 00.2	45.2	74 43.0	26.1	259 13.0	36.7	324 29.2	54.8					
	18	312 44.2	137 00.2 N	2 44.3	89 43.7	S16 26.6	274 15.8	N13 36.6	339 31.7	S12 54.8	Arcturus	145 49.2	N19 03.6		
	19	327 46.7	152 00.1	43.5	104 44.5	27.1	289 18.6	36.5	354 34.2	54.8	Atria	107 13.0	S69 04.3		
	20	342 49.1	167 00.0	42.6	119 45.2	27.7	304 21.4	36.4	9 36.6	54.8	Avior	234 15.1	S59 34.7		
	21	357 51.6	182 00.0	41.7	134 45.9	28.2	319 24.2	36.3	24 39.1	54.8	Bellatrix	278 23.7	N 6 22.4		
	22	12 54.1	196 59.9	40.8	149 46.7	28.7	334 27.0	36.2	39 41.6	54.8	Betelgeuse	270 52.9	N 7 24.8		
	23	27 56.5	211 59.9	40.0	164 47.4	29.3	349 29.8	36.1	54 44.0	54.8					
S A T U R D A Y	4 00	42 59.0	226 59.8 N	2 39.1	179 48.2	S16 29.8	4 32.6	N13 36.0	69 46.5	S12 54.8	Canopus	263 52.5	S52 42.2		
	01	58 01.4	241 59.7	38.2	194 48.9	30.3	19 35.4	35.9	84 49.0	54.8	Capella	280 23.0	N46 01.2		
	02	73 03.9	256 59.7	37.3	209 49.6	30.8	34 38.2	35.8	99 51.4	54.8	Deneb	49 26.5	N45 22.2		
	03	88 06.4	271 59.6	36.4	224 50.4	31.4	49 41.0	35.7	114 53.9	54.8	Denebola	182 26.2	N14 26.4		
	04	103 08.8	286 59.5	35.6	239 51.1	31.9	64 43.8	35.6	129 56.4	54.8	Diphda	348 48.0	S17 51.4		
	05	118 11.3	301 59.5	34.7	254 51.8	32.4	79 46.5	35.5	144 58.8	54.8					
	06	133 13.8	316 59.4 N	2 33.8	269 52.6	S16 32.9	94 49.3	N13 35.4	160 01.3	S12 54.8	Dubhe	193 42.6	N61 37.2		
	07	148 16.2	331 59.4	32.9	284 53.3	33.5	109 52.1	35.2	175 03.8	54.7	Elnath	278 02.8	N28 37.6		
	08	163 18.7	346 59.3	32.0	299 54.1	34.0	124 54.9	35.1	190 06.2	54.7	Eltanin	90 43.0	N51 29.3		
	09	178 21.2	1 59.2	31.1	314 54.8	34.5	139 57.7	35.0	205 08.7	54.7	Enif	33 39.7	N 9 59.2		
	10	193 23.6	16 59.2	30.3	329 55.5	35.0	155 00.5	34.9	220 11.2	54.7	Fomalhaut	15 15.4	S29 29.9		
	11	208 26.1	31 59.1	29.4	344 56.3	35.6	170 03.3	34.8	235 13.6	54.7					
	12	223 28.6	46 59.0 N	2 28.5	359 57.0	S16 36.1	185 06.1	N13 34.7	250 16.1	S12 54.7	Gacrux	171 53.3	S57 14.5		
	13	238 31.0	61 59.0	27.6	14 57.7	36.6	200 08.9	34.6	265 18.6	54.7	Gienah	175 44.9	S17 40.2		
	14	253 33.5	76 58.9	26.7	29 58.5	37.1	215 11.7	34.5	280 21.0	54.7	Hadar	148 38.1	S60 29.1		
	15	268 35.9	91 58.8	25.8	44 59.2	37.7	230 14.5	34.4	295 23.5	54.7	Hamal	327 52.0	N23 34.6		
	16	283 38.4	106 58.8	24.9	59 59.9	38.2	245 17.3	34.3	310 26.0	54.7	Kaus Aust.	83 34.1	S34 22.5		
	17	298 40.9	121 58.7	24.0	75 00.7	38.7	260 20.1	34.2	325 28.4	54.7					
	18	313 43.3	136 58.6 N	2 23.2	90 01.4	S16 39.2	275 22.9	N13 34.1	340 30.9	S12 54.7	Kochab	137 20.9	N74 03.4		
	19	328 45.8	151 58.6	22.3	105 02.1	39.8	290 25.7	34.0	355 33.3	54.7	Markab	13 30.7	N15 20.1		
	20	343 48.3	166 58.5	21.4	120 02.9	40.3	305 28.5	33.9	10 35.8	54.7	Menkar	314 06.9	N 4 11.1		
	21	358 50.7	181 58.4	20.5	135 03.6	40.8	320 31.3	33.8	25 38.3	54.7	Menkent	147 59.2	S36 29.1		
	22	13 53.2	196 58.4	19.6	150 04.3	41.3	335 34.1	33.7	40 40.7	54.7	Miaplacidus	221 38.6	S69 48.5		
	23	28 55.7	211 58.3	18.7	165 05.1	41.9	350 36.9	33.6	55 43.2	54.7					
S U N D A Y	5 00	43 58.1	226 58.2 N	2 17.8	180 05.8	S16 42.4	5 39.7	N13 33.5	70 45.7	S12 54.7	Mirfak	308 29.2	N49 56.8		
	01	59 00.6	241 58.1	16.9	195 06.5	42.9	20 42.5	33.4	85 48.1	54.7	Nunki	75 49.2	S26 16.1		
	02	74 03.0	256 58.1	16.0	210 07.3	43.4	35 45.3	33.3	100 50.6	54.7	Peacock	53 07.4	S56 39.7		
	03	89 05.5	271 58.0	15.1	225 08.0	43.9	50 48.1	33.2	115 53.0	54.6	Pollux	243 18.4	N27 58.1		
	04	104 08.0	286 57.9	14.2	240 08.7	44.5	65 50.9	33.1	130 55.5	54.6	Procyon	244 51.8	N 5 09.9		
	05	119 10.4	301 57.9	13.4	255 09.5	45.0	80 53.7	33.0	145 58.0	54.6					
	06	134 12.9	316 57.8 N	2 12.5	270 10.2	S16 45.5	95 56.5	N13 32.9	161 00.4	S12 54.6	Rasalhague	95 59.7	N12 32.7		
	07	149 15.4	331 57.7	11.6	285 10.9	46.0	110 59.3	32.8	176 02.9	54.6	Regulus	207 35.6	N11 51.1		
	08	164 17.8	346 57.6	10.7	300 11.7	46.5	126 02.1	32.7	191 05.4	54.6	Rigel	281 04.6	S 8 10.3		
	09	179 20.3	1 57.6	09.8	315 12.4	47.1	141 04.9	32.6	206 07.8	54.6	Rigel Kent.	139 42.4	S60 55.9		
	10	194 22.8	16 57.5	08.9	330 13.1	47.6	156 07.7	32.5	221 10.3	54.6	Sabik	102 04.2	S15 45.2		
	11	209 25.2	31 57.4	08.0	345 13.9	48.1	171 10.5	32.4	236 12.7	54.6					
	12	224 27.7	46 57.3 N	2 07.1	0 14.6	S16 48.6	186 13.3	N13 32.3	251 15.2	S12 54.6	Schedar	349 31.7	N56 40.2		
	13	239 30.2	61 57.3	06.2	15 15.3	49.1	201 16.1	32.2	266 17.7	54.6	Shaula	96 12.1	S37 07.3		
	14	254 32.6	76 57.2	05.3	30 16.1	49.7	216 18.9	32.1	281 20.1	54.6	Sirius	258 26.9	S16 44.7		
	15	269 35.1	91 57.1	04.4	45 16.8	50.2	231 21.6	32.0	296 22.6	54.6	Spica	158 23.7	S11 17.0		
	16	284 37.5	106 57.0	03.5	60 17.5	50.7	246 24.4	31.9	311 25.0	54.6	Suhail	222 47.1	S43 31.4		
	17	299 40.0	121 57.0	02.6	75 18.2	51.2	261 27.2	31.8	326 27.5	54.6					
	18	314 42.5	136 56.9 N	2 01.7	90 19.0	S16 51.7	276 30.0	N13 31.7	341 30.0	S12 54.6	Vega	80 34.1	N38 48.5		
	19	329 44.9	151 56.8	2 00.8	105 19.7	52.3	291 32.8	31.6	356 32.4	54.6	Zuben'ubi	136 57.5	S16 08.3		
	20	344 47.4	166 56.7	1 59.9	120 20.4	52.8	306 35.6	31.5	11 34.9	54.5					
	21	359 49.9	181 56.7	59.0	135 21.2	53.3	321 38.4	31.4	26 37.3	54.5					
	22	14 52.3	196 56.6	58.1	150 21.9	53.8	336 41.2	31.3	41 39.8	54.5	Venus	184 00.8	h 8 52		
	23	29 54.8	211 56.5	57.2	165 22.6	54.3	351 44.0	31.2	56 42.3	54.5	Mars	136 49.2	12 00		
h m		Mer. Pass. 21 04.6		v −0.1 d 0.9	v 0.7 d 0.5	v 2.8 d 0.1	v 2.5 d 0.0								
												SHA		Mer. Pass.	
														h m	
														Jupiter	
														Saturn	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	3		4	5	6		
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m		
F R I D A Y	3 00	184 06.8	S14 54.4	296 14.2	8.6	N27 51.0	2.9	55.5	N 70	06 11	07 27	08 44				22 08	
	01	199 06.8	55.2	310 41.8	8.6	27 48.1	3.1	55.5	68	06 07	07 15	08 22			20 19	22 33	
	02	214 06.8	56.0	325 09.4	8.7	27 45.0	3.2	55.5	66	06 03	07 05	08 05		18 11	20 58	22 52	
	03	229 06.8	56.8	339 37.1	8.7	27 41.8	3.3	55.4	64	05 59	06 57	07 51		19 29	21 25	23 07	
	04	244 06.8	57.6	354 04.8	8.8	27 38.5	3.5	55.4	62	05 56	06 50	07 39	18 15	20 05	21 46	23 20	
	05	259 06.8	58.4	8 32.6	8.9	27 35.0	3.6	55.4	60	05 53	06 43	07 29	18 57	20 31	22 03	23 31	
	06	274 06.8	S14 59.1	23 00.5	9.0	N27 31.4	3.7	55.3	N 58	05 51	06 38	07 20	19 26	20 51	22 17	23 40	
	07	289 06.8	14 59.9	37 28.5	9.0	27 27.7	3.9	55.3	56	05 48	06 32	07 13	19 48	21 08	22 29	23 48	
	08	304 06.8	15 00.7	51 56.5	9.1	27 23.8	4.1	55.3	54	05 46	06 28	07 06	20 06	21 22	22 39	23 55	
	09	319 06.8	01.5	66 24.6	9.2	27 19.7	4.1	55.3	52	05 44	06 24	07 00	20 21	21 34	22 49	24 02	
	10	334 06.8	02.3	80 52.8	9.3	27 15.6	4.3	55.2	50	05 41	06 20	06 54	20 34	21 45	22 57	24 07	
	11	349 06.8	03.1	95 21.1	9.3	27 11.3	4.5	55.2	45	05 36	06 11	06 42	21 01	22 08	23 14	24 20	
	12	4 06.8	S15 03.8	109 49.4	9.4	N27 06.8	4.5	55.2	N 40	05 32	06 04	06 32	21 23	22 26	23 29	24 30	
	13	19 06.8	04.6	124 17.8	9.5	27 02.3	4.7	55.2	35	05 27	05 57	06 23	21 40	22 41	23 41	24 39	
	14	34 06.8	05.4	138 46.3	9.6	26 57.6	4.8	55.2	30	05 23	05 51	06 16	21 56	22 54	23 51	24 46	
	15	49 06.8	06.2	153 14.9	9.7	26 52.8	5.0	55.1	20	05 14	05 40	06 03	22 21	23 16	24 09	00 09	
	16	64 06.8	07.0	167 43.6	9.7	26 47.8	5.1	55.1	N 10	05 04	05 29	05 51	22 44	23 35	24 24	00 24	
	17	79 06.8	07.7	182 12.3	9.8	26 42.7	5.2	55.1	0	04 54	05 19	05 40	23 04	23 53	24 39	00 39	
	18	94 06.8	S15 08.5	196 41.1	9.9	N26 37.5	5.3	55.1	S 10	04 42	05 07	05 29	23 25	24 11	00 11	00 53	
	19	109 06.8	09.3	211 10.0	10.0	26 32.2	5.5	55.0	20	04 27	04 54	05 17	23 47	24 30	00 30	01 09	
	20	124 06.8	10.1	225 39.0	10.0	26 26.7	5.6	55.0	30	04 08	04 38	05 03	24 12	00 12	00 52	01 26	
	21	139 06.8	10.8	240 08.0	10.2	26 21.1	5.7	55.0	35	03 55	04 28	04 55	24 27	00 27	01 05	01 36	
	22	154 06.8	11.6	254 37.2	10.2	26 15.4	5.9	55.0	40	03 41	04 17	04 46	00 01	00 44	01 19	01 48	
	23	169 06.8	12.4	269 06.4	10.3	26 09.5	5.9	55.0	45	03 22	04 03	04 35	00 24	01 05	01 37	02 01	
	S A T U R D A Y	4 00	184 06.8	S15 13.2	283 35.7	10.4	N26 03.6	6.1	54.9	S 50	02 58	03 45	04 22	00 54	01 31	01 58	02 18
01		199 06.8	13.9	298 05.1	10.4	25 57.5	6.2	54.9	52	02 46	03 37	04 16	01 08	01 44	02 08	02 26	
02		214 06.8	14.7	312 34.5	10.6	25 51.3	6.3	54.9	54	02 32	03 27	04 09	01 25	01 58	02 19	02 34	
03		229 06.8	15.5	327 04.1	10.6	25 45.0	6.5	54.9	56	02 15	03 17	04 01	01 45	02 15	02 32	02 44	
04		244 06.8	16.3	341 33.7	10.7	25 38.5	6.5	54.9	58	01 54	03 04	03 53	02 11	02 35	02 47	02 55	
05		259 06.8	17.0	356 03.4	10.9	25 32.0	6.7	54.8	S 60	01 25	02 49	03 43	02 45	03 00	03 05	03 07	
06		274 06.8	S15 17.8	10 33.3	10.8	N25 25.3	6.8	54.8	Lat.	Sunset	Twilight		Moonset				
07		289 06.8	18.6	25 03.1	11.0	25 18.5	6.9	54.8			Civil	Naut.	3	4	5	6	
08		304 06.8	19.4	39 33.1	11.1	25 11.6	7.0	54.8	°	h m	h m	h m	h m	h m	h m	h m	
09		319 06.8	20.1	54 03.2	11.1	25 04.6	7.1	54.8	N 72	14 11	15 44	17 09				17 12	
10		334 06.8	20.9	68 33.3	11.3	24 57.5	7.3	54.7	N 70	14 42	15 59	17 14				16 35	
11		349 06.8	21.7	83 03.6	11.3	24 50.2	7.3	54.7	68	15 04	16 11	17 19			16 52	16 08	
12		4 06.8	S15 22.4	97 33.9	11.4	N24 42.9	7.5	54.7	66	15 21	16 21	17 23		17 22	16 11	15 47	
13		19 06.7	23.2	112 04.3	11.5	24 35.4	7.5	54.7	66	15 21	16 21	17 23		17 22	16 11	15 47	
14		34 06.7	24.0	126 34.8	11.5	24 27.9	7.7	54.7	64	15 35	16 29	17 26		16 04	15 43	15 31	
15		49 06.7	24.8	141 05.3	11.7	24 20.2	7.8	54.7	62	15 47	16 37	17 30	15 33	15 27	15 22	15 17	
16		64 06.7	25.5	155 36.0	11.7	24 12.4	7.9	54.6	60	15 57	16 43	17 33	14 51	15 01	15 04	15 05	
17		79 06.7	26.3	170 06.7	11.8	24 04.5	8.0	54.6	N 58	16 06	16 49	17 35	14 22	14 40	14 50	14 55	
18		94 06.7	S15 27.1	184 37.5	11.9	N23 56.5	8.1	54.6	56	16 14	16 54	17 38	13 59	14 23	14 37	14 46	
19		109 06.7	27.8	199 08.4	12.0	23 48.4	8.2	54.6	54	16 21	16 58	17 40	13 41	14 08	14 26	14 38	
20		124 06.7	28.6	213 39.4	12.1	23 40.2	8.2	54.6	52	16 27	17 03	17 43	13 26	13 55	14 16	14 31	
21		139 06.7	29.4	228 10.5	12.2	23 32.0	8.4	54.6	50	16 32	17 07	17 45	13 12	13 44	14 07	14 25	
22		154 06.7	30.1	242 41.7	12.2	23 23.6	8.5	54.5	45	16 45	17 15	17 50	12 44	13 20	13 48	14 11	
23		169 06.6	30.9	257 12.9	12.3	23 15.1	8.6	54.5	N 40	16 55	17 23	17 55	12 22	13 01	13 33	13 59	
S U N D A Y		5 00	184 06.6	S15 31.7	271 44.2	12.5	N23 06.5	8.7	54.5	35	17 03	17 30	18 00	12 04	12 46	13 20	13 49
	01	199 06.6	32.4	286 15.7	12.4	22 57.8	8.8	54.5	30	17 11	17 36	18 04	11 49	12 32	13 09	13 41	
	02	214 06.6	33.2	300 47.1	12.6	22 49.0	8.9	54.5	20	17 24	17 47	18 13	11 22	12 08	12 49	13 26	
	03	229 06.6	33.9	315 18.7	12.7	22 40.1	8.9	54.5	N 10	17 36	17 58	18 23	10 59	11 48	12 32	13 12	
	04	244 06.6	34.7	329 50.4	12.7	22 31.2	9.1	54.5	0	17 47	18 08	18 33	10 37	11 28	12 16	13 00	
	05	259 06.6	35.5	344 22.1	12.8	22 22.1	9.2	54.5	S 10	17 58	18 20	18 46	10 16	11 09	11 59	12 47	
	06	274 06.6	S15 36.2	358 53.9	12.9	N22 12.9	9.2	54.4	20	18 10	18 33	19 01	09 52	10 48	11 42	12 34	
	07	289 06.5	37.0	13 25.8	13.0	22 03.7	9.4	54.4	30	18 24	18 50	19 20	09 25	10 24	11 22	12 18	
	08	304 06.5	37.8	27 57.8	13.1	21 54.3	9.4	54.4	35	18 33	19 00	19 32	09 09	10 10	11 10	12 09	
	09	319 06.5	38.5	42 29.9	13.1	21 44.9	9.5	54.4	40	18 42	19 11	19 47	08 51	09 53	10 56	11 58	
	10	334 06.5	39.3	57 02.0	13.2	21 35.4	9.6	54.4	45	18 53	19 25	20 06	08 28	09 33	10 40	11 46	
	11	349 06.5	40.0	71 34.2	13.3	21 25.8	9.7	54.4	S 50	19 06	19 43	20 31	07 59	09 08	10 20	11 31	
	12	4 06.5	S15 40.8	86 06.5	13.4	N21 16.1	9.8	54.4	52	19 13	19 52	20 43	07 44	08 56	10 10	11 24	
	13	19 06.5	41.6	100 38.9	13.4	21 06.3	9.8	54.4	54	19 20	20 01	20 57	07 28	08 42	09 59	11 16	
	14	34 06.4	42.3	115 11.3	13.6	20 56.5	10.0	54.4	56	19 27	20 12	21 15	07 08	08 25	09 47	11 07	
	15	49 06.4	43.1	129 43.9	13.6	20 46.5	10.0	54.3	58	19 36	20 25	21 37	06 43	08 06	09 32	10 57	
	16	64 06.4	43.8	144 16.5	13.7	20 36.5	10.1	54.3	S 60	19 46	20 40	22 07	06 08	07 41	09 15	10 45	
	17	79 06.4	44.6	158 49.2	13.7	20 26.4	10.2	54.3	Day	SUN		MOON					
	18	94 06.4	S15 45.3	173 21.9	13.8	N20 16.2	10.3	54.3		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
	19	109 06.3	46.1	187 54.7	13.9	20 05.9	10.4	54.3	00 ^h	12 ^h	Pass.	Upper	Lower				
	20	124 06.3	46.9	202 27.6	14.0	19 55.5	10.4	54.3	d	m s	m s	h m	h m	h m	d	%	
	21	139 06.3	47.6	217 00.6	14.0	19 45.1	10.5	54.3	3	16 27	16 27	11 44	04 25	16 51	20 68		
	22	154 06.3	48.4	231 33.6	14.2	19 34.6	10.6	5									

UT	ARIES		VENUS -4.4		MARS +1.4		JUPITER -2.9		SATURN +0.7		STARS		
	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	Name	SHA	Dec			
MONDAY	00 44 57.3	226 56.4 N 1 56.3	180 23.3 S16 54.8	6 46.8 N13 31.1	71 44.7 S12 54.5	Acamar	315 12.1 S40 12.5						
	01 59 59.7	241 56.3 55.4	195 24.1 55.4	21 49.6 31.0	86 47.2 54.5	Achernar	335 20.4 S57 07.0						
	02 75 02.2	256 56.3 54.5	210 24.8 55.9	36 52.4 30.9	101 49.6 54.5	Acrux	173 01.8 S63 13.6						
	03 90 04.7	271 56.2 53.6	225 25.5 56.4	51 55.2 30.8	116 52.1 54.5	Adhara	255 06.5 S29 00.0						
	04 105 07.1	286 56.1 52.7	240 26.2 56.9	66 58.0 30.7	131 54.6 54.5	Aldebaran	290 40.5 N16 33.5						
	05 120 09.6	301 56.0 51.8	255 27.0 57.4	82 00.8 30.6	146 57.0 54.5								
	06 135 12.0	316 55.9 N 1 50.9	270 27.7 S16 57.9	97 03.6 N13 30.4	161 59.5 S12 54.5	Alioth	166 14.3 N55 49.8						
	07 150 14.5	331 55.9 50.0	285 28.4 58.5	112 06.4 30.3	177 01.9 54.5	Alkaid	152 53.3 N49 11.6						
	08 165 17.0	346 55.8 49.1	300 29.1 59.0	127 09.2 30.2	192 04.4 54.5	Alnair	27 34.0 S46 50.9						
	09 180 19.4	1 55.7 48.2	315 29.9 16 59.5	142 12.0 30.1	207 06.8 54.5	Alnilam	275 38.5 S 1 11.1						
	10 195 21.9	16 55.6 47.2	330 30.6 17 00.0	157 14.8 30.0	222 09.3 54.4	Alphard	217 48.8 S 8 45.5						
	11 210 24.4	31 55.5 46.3	345 31.3 00.5	172 17.6 29.9	237 11.8 54.4								
	12 225 26.8	46 55.4 N 1 45.4	0 32.0 S17 01.0	187 20.4 N13 29.8	252 14.2 S12 54.4	Alphecca	126 05.0 N26 38.2						
	13 240 29.3	61 55.4 44.5	15 32.8 01.5	202 23.2 29.7	267 16.7 54.4	Alpheratz	357 35.6 N29 13.5						
	14 255 31.8	76 55.3 43.6	30 33.5 02.1	217 26.0 29.6	282 19.1 54.4	Altair	62 01.0 N 8 56.0						
	15 270 34.2	91 55.2 42.7	45 34.2 02.6	232 28.8 29.5	297 21.6 54.4	Ankaa	353 07.8 S42 10.7						
	16 285 36.7	106 55.1 41.8	60 34.9 03.1	247 31.6 29.4	312 24.0 54.4	Antares	112 17.4 S26 29.0						
	17 300 39.1	121 55.0 40.9	75 35.7 03.6	262 34.4 29.3	327 26.5 54.4								
	18 315 41.6	136 54.9 N 1 40.0	90 36.4 S17 04.1	277 37.1 N13 29.2	342 29.0 S12 54.4	Arcturus	145 49.2 N19 03.6						
	19 330 44.1	151 54.9 39.1	105 37.1 04.6	292 39.9 29.1	357 31.4 54.4	Atria	107 13.0 S69 04.3						
	20 345 46.5	166 54.8 38.2	120 37.8 05.1	307 42.7 29.0	12 33.9 54.4	Avior	234 15.0 S59 34.7						
	21 0 49.0	181 54.7 37.2	135 38.5 05.7	322 45.5 28.9	27 36.3 54.4	Bellatrix	278 23.7 N 6 22.4						
	22 15 51.5	196 54.6 36.3	150 39.3 06.2	337 48.3 28.8	42 38.8 54.3	Betelgeuse	270 52.9 N 7 24.8						
	23 30 53.9	211 54.5 35.4	165 40.0 06.7	352 51.1 28.7	57 41.2 54.3								
TUESDAY	00 45 56.4	226 54.4 N 1 34.5	180 40.7 S17 07.2	7 53.9 N13 28.6	72 43.7 S12 54.3	Canopus	263 52.5 S52 42.2						
	01 60 58.9	241 54.3 33.6	195 41.4 07.7	22 56.7 28.5	87 46.1 54.3	Capella	280 23.0 N46 01.2						
	02 76 01.3	256 54.2 32.7	210 42.2 08.2	37 59.5 28.4	102 48.6 54.3	Deneb	49 26.6 N45 22.1						
	03 91 03.8	271 54.2 31.8	225 42.9 08.7	53 02.3 28.3	117 51.0 54.3	Denebola	182 26.2 N14 26.4						
	04 106 06.3	286 54.1 30.9	240 43.6 09.2	68 05.1 28.2	132 53.5 54.3	Diphda	348 48.0 S17 51.4						
	05 121 08.7	301 54.0 29.9	255 44.3 09.7	83 07.9 28.1	147 56.0 54.3								
	06 136 11.2	316 53.9 N 1 29.0	270 45.0 S17 10.3	98 10.7 N13 28.0	162 58.4 S12 54.3	Dubhe	193 42.5 N61 37.2						
	07 151 13.6	331 53.8 28.1	285 45.8 10.8	113 13.5 27.9	178 00.9 54.3	Einath	278 02.8 N28 37.6						
	08 166 16.1	346 53.7 27.2	300 46.5 11.3	128 16.3 27.8	193 03.3 54.3	Eltanin	90 43.0 N51 29.3						
	09 181 18.6	1 53.6 26.3	315 47.2 11.8	143 19.1 27.7	208 05.8 54.2	Enif	33 39.7 N 9 59.1						
	10 196 21.0	16 53.5 25.4	330 47.9 12.3	158 21.9 27.6	223 08.2 54.2	Fomalhaut	15 15.4 S29 29.9						
	11 211 23.5	31 53.4 24.4	345 48.6 12.8	173 24.7 27.5	238 10.7 54.2								
	12 226 26.0	46 53.3 N 1 23.5	0 49.3 S17 13.3	188 27.5 N13 27.4	253 13.1 S12 54.2	Gacrux	171 53.3 S57 14.5						
	13 241 28.4	61 53.2 22.6	15 50.1 13.8	203 30.3 27.3	268 15.6 54.2	Gienah	175 44.9 S17 40.2						
	14 256 30.9	76 53.2 21.7	30 50.8 14.3	218 33.1 27.2	283 18.0 54.2	Hadar	148 38.1 S60 29.1						
	15 271 33.4	91 53.1 20.8	45 51.5 14.8	233 35.8 27.1	298 20.5 54.2	Hamal	327 52.0 N23 34.6						
	16 286 35.8	106 53.0 19.9	60 52.2 15.3	248 38.6 27.0	313 22.9 54.2	Kaus Aust.	83 34.1 S34 22.5						
	17 301 38.3	121 52.9 18.9	75 52.9 15.9	263 41.4 26.9	328 25.4 54.2								
	18 316 40.8	136 52.8 N 1 18.0	90 53.6 S17 16.4	278 44.2 N13 26.8	343 27.8 S12 54.2	Kochab	137 20.9 N74 03.4						
	19 331 43.2	151 52.7 17.1	105 54.4 16.9	293 47.0 26.7	358 30.3 54.2	Markab	13 30.7 N15 20.1						
	20 346 45.7	166 52.6 16.2	120 55.1 17.4	308 49.8 26.6	13 32.7 54.1	Menkar	314 06.9 N 4 11.1						
	21 1 48.1	181 52.5 15.2	135 55.8 17.9	323 52.6 26.5	28 35.2 54.1	Menkent	147 59.2 S36 29.1						
	22 16 50.6	196 52.4 14.3	150 56.5 18.4	338 55.4 26.4	43 37.6 54.1	Miaplacidus	221 38.5 S69 48.5						
	23 31 53.1	211 52.3 13.4	165 57.2 18.9	353 58.2 26.3	58 40.1 54.1								
WEDNESDAY	00 46 55.5	226 52.2 N 1 12.5	180 57.9 S17 19.4	9 01.0 N13 26.2	73 42.5 S12 54.1	Mirfak	308 29.2 N49 56.8						
	01 61 58.0	241 52.1 11.6	195 58.7 19.9	24 03.8 26.1	88 45.0 54.1	Nunki	75 49.2 S26 16.1						
	02 77 00.5	256 52.0 10.6	210 59.4 20.4	39 06.6 26.0	103 47.4 54.1	Peacock	53 07.4 S56 39.7						
	03 92 02.9	271 51.9 09.7	226 00.1 20.9	54 09.4 25.9	118 49.9 54.1	Pollux	243 18.4 N27 58.1						
	04 107 05.4	286 51.8 08.8	241 00.8 21.4	69 12.2 25.8	133 52.3 54.1	Procyon	244 51.8 N 5 09.9						
	05 122 07.9	301 51.7 07.9	256 01.5 21.9	84 15.0 25.7	148 54.8 54.1								
	06 137 10.3	316 51.6 N 1 06.9	271 02.2 S17 22.4	99 17.8 N13 25.6	163 57.2 S12 54.0	Rasalhague	95 59.7 N12 32.7						
	07 152 12.8	331 51.5 06.0	286 02.9 22.9	114 20.6 25.5	178 59.7 54.0	Regulus	207 35.6 N11 51.1						
	08 167 15.2	346 51.4 05.1	301 03.7 23.4	129 23.4 25.4	194 02.1 54.0	Rigel	281 04.5 S 8 10.3						
	09 182 17.7	1 51.3 04.2	316 04.4 24.0	144 26.1 25.3	209 04.6 54.0	Rigel Kent.	139 42.4 S60 55.9						
	10 197 20.2	16 51.2 03.2	331 05.1 24.5	159 28.9 25.2	224 07.0 54.0	Sabik	102 04.2 S15 45.2						
	11 212 22.6	31 51.1 02.3	346 05.8 25.0	174 31.7 25.1	239 09.5 54.0								
	12 227 25.1	46 51.0 N 1 01.4	1 06.5 S17 25.5	189 34.5 N13 25.0	254 11.9 S12 54.0	Schedar	349 31.7 N56 40.3						
	13 242 27.6	61 50.9 1 00.5	16 07.2 26.0	204 37.3 24.9	269 14.4 54.0	Shaula	96 12.1 S37 07.3						
	14 257 30.0	76 50.8 0 59.5	31 07.9 26.5	219 40.1 24.8	284 16.8 54.0	Sirius	258 26.9 S16 44.7						
	15 272 32.5	91 50.7 58.6	46 08.6 27.0	234 42.9 24.7	299 19.3 53.9	Spica	158 23.7 S11 17.0						
	16 287 35.0	106 50.6 57.7	61 09.3 27.5	249 45.7 24.6	314 21.7 53.9	Suhail	222 47.1 S43 31.4						
	17 302 37.4	121 50.5 56.7	76 10.1 28.0	264 48.5 24.5	329 24.2 53.9								
	18 317 39.9	136 50.4 N 0 55.8	91 10.8 S17 28.5	279 51.3 N13 24.4	344 26.6 S12 53.9	Vega	80 34.2 N38 48.5						
	19 332 42.4	151 50.3 54.9	106 11.5 29.0	294 54.1 24.3	359 29.1 53.9	Zuben'ubi	136 57.5 S16 08.3						
	20 347 44.8	166 50.2 53.9	121 12.2 29.5	309 56.9 24.2	14 31.5 53.9								
	21 2 47.3	181 50.1 53.0	136 12.9 30.0	324 59.7 24.1	29 34.0 53.9								
	22 17 49.7	196 50.0 52.1	151 13.6 30.5	340 02.5 24.0	44 36.4 53.9	Venus	180 58.0 8 52						
	23 32 52.2	211 49.9 51.2	166 14.3 31.0	355 05.3 23.9	59 38.9 53.9	Mars	134 44.3 11 57						
					Jupiter	321 57.5 23 24							
					Saturn	26 47.3 19 06							

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	6	7	8	9		
MONDAY	d h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	
	00	184	06.2	S15	49.9	260	40.0	14.2	N19	13.4	10.8	54.3	N 70	06	28	07	55	09	36	
	01	199	06.2		50.6	275	13.2	14.3	N19	13.4	10.8	54.3	N 70	06	22	07	39	09	00	
	02	214	06.2		51.4	289	46.5	14.4	18	51.8	10.9	54.3	68	06	16	07	25	08	35	
	03	229	06.2		52.1	304	19.9	14.5	18	40.9	10.9	54.3	66	06	11	07	14	08	16	
	04	244	06.2		52.9	318	53.4	14.5	18	30.0	11.0	54.2	64	06	07	07	05	08	00	
	05	259	06.1		53.6	333	26.9	14.6	18	19.0	11.1	54.2	62	06	03	06	57	07	48	
	06	274	06.1	S15	54.4	348	00.5	14.7	N18	07.9	11.2	54.2	60	06	00	06	50	07	37	
	07	289	06.1		55.2	2	34.2	14.7	17	56.7	11.2	54.2	N 58	05	57	06	44	07	27	
	08	304	06.1		55.9	17	07.9	14.8	17	45.5	11.3	54.2	56	05	54	06	38	07	19	
	09	319	06.0		56.7	31	41.7	14.8	17	34.2	11.4	54.2	54	05	51	06	33	07	12	
	10	334	06.0		57.4	46	15.5	14.9	17	22.8	11.5	54.2	52	05	48	06	29	07	05	
	11	349	06.0		58.2	60	49.4	15.0	17	11.3	11.5	54.2	50	05	46	06	24	06	59	
	12	4	06.0	S15	58.9	75	23.4	15.1	N16	59.8	11.5	54.2	45	05	40	06	15	06	46	
	13	19	05.9	15	59.6	89	57.5	15.0	16	48.3	11.7	54.2	N 40	05	35	06	07	06	35	
	14	34	05.9	16	00.4	104	31.5	15.2	16	36.6	11.7	54.2	35	05	30	06	00	06	26	
	15	49	05.9		01.1	119	05.7	15.2	16	24.9	11.7	54.2	30	05	25	05	53	06	18	
	16	64	05.9		01.9	133	39.9	15.3	16	13.2	11.8	54.2	20	05	15	05	41	06	04	
	17	79	05.8		02.6	148	14.2	15.3	16	01.4	11.9	54.2	N 10	05	05	05	30	05	52	
	18	94	05.8	S16	03.4	162	48.5	15.4	N15	49.5	12.0	54.2	0	04	54	05	19	05	40	
	19	109	05.8		04.1	177	22.9	15.4	15	37.5	12.0	54.2	S 10	04	41	05	06	05	28	
	20	124	05.8		04.9	191	57.3	15.5	15	25.5	12.0	54.2	20	04	25	04	52	05	16	
	21	139	05.7		05.6	206	31.8	15.5	15	13.5	12.2	54.2	30	04	05	04	35	05	01	
	22	154	05.7		06.4	221	06.3	15.6	15	01.3	12.1	54.2	35	03	52	04	25	04	52	
	23	169	05.7		07.1	235	40.9	15.7	14	49.2	12.3	54.2	40	03	37	04	13	04	43	
TUESDAY	00	184	05.6	S16	07.9	250	15.6	15.7	N14	36.9	12.3	45	03	17	03	58	04	31	02	01
	01	199	05.6		08.6	264	50.3	15.7	14	24.6	12.3	54.2	S 50	02	52	03	40	04	17	
	02	214	05.6		09.3	279	25.0	15.8	14	12.3	12.4	54.2	52	02	39	03	31	04	10	
	03	229	05.6		10.1	293	59.8	15.8	13	59.9	12.4	54.2	54	02	23	03	21	04	03	
	04	244	05.5		10.8	308	34.6	15.9	13	47.5	12.6	54.2	56	02	05	03	09	03	55	
	05	259	05.5		11.6	323	09.5	15.9	13	34.9	12.5	54.2	58	01	41	02	56	03	46	
	06	274	05.5	S16	12.3	337	44.4	16.0	N13	22.4	12.6	54.2	S 60	01	07	02	40	03	35	
	07	289	05.4		13.0	352	19.4	16.0	13	09.8	12.7	54.2		Lat.		Sunset		Twilight		
	08	304	05.4		13.8	6	54.4	16.0	12	57.1	12.7	54.2				Civil		Naut.		
	09	319	05.4		14.5	21	29.4	16.1	12	44.4	12.7	54.2				6		7		
	10	334	05.3		15.3	36	04.5	16.2	12	31.7	12.8	54.2				8		9		
	11	349	05.3		16.0	50	39.7	16.1	12	18.9	12.9	54.2								
	12	4	05.3	S16	16.7	65	14.8	16.2	N12	06.0	12.9	54.2	N 72	13	50	15	31	16	57	
	13	19	05.2		17.5	79	50.0	16.3	11	53.1	13.0	54.2	N 70	14	26	15	47	17	04	
	14	34	05.2		18.2	94	25.3	16.3	11	40.1	12.9	54.2	68	14	51	16	01	17	10	
	15	49	05.2		18.9	109	00.6	16.3	11	27.2	13.1	54.2	66	15	10	16	12	17	15	
	16	64	05.1		19.7	123	35.9	16.3	11	14.1	13.1	54.2	64	15	26	16	21	17	19	
	17	79	05.1		20.4	138	11.2	16.4	11	01.0	13.1	54.3	62	15	39	16	29	17	23	
	18	94	05.1	S16	21.2	152	46.6	16.4	N10	47.9	13.2	54.3	60	15	50	16	36	17	27	
	19	109	05.0		21.9	167	22.0	16.5	10	34.7	13.2	54.3	N 58	15	59	16	43	17	30	
	20	124	05.0		22.6	181	57.5	16.5	10	21.5	13.2	54.3	56	16	08	16	48	17	33	
	21	139	04.9		23.4	196	33.0	16.5	10	08.3	13.3	54.3	54	16	15	16	53	17	36	
	22	154	04.9		24.1	211	08.5	16.5	9	55.0	13.4	54.3	52	16	22	16	58	17	38	
	23	169	04.9		24.8	225	44.0	16.5	9	41.6	13.3	54.3	50	16	28	17	02	17	41	
	WEDNESDAY	00	184	04.8	S16	25.6	240	19.5	16.6	N 9	28.3	13.4	45	16	41	17	12	17	47	14
01		199	04.8		26.3	254	55.1	16.6	9	14.9	13.5	54.3	N 40	16	51	17	20	17	52	
02		214	04.8		27.0	269	30.7	16.7	9	01.4	13.5	54.3	35	17	01	17	27	17	57	
03		229	04.7		27.7	284	06.4	16.6	8	47.9	13.5	54.3	30	17	09	17	34	18	02	
04		244	04.7		28.5	298	42.0	16.7	8	34.4	13.6	54.3	20	17	23	17	46	18	12	
05		259	04.6		29.2	313	17.7	16.7	8	20.8	13.6	54.3	N 10	17	35	17	57	18	22	
06		274	04.6	S16	29.9	327	53.4	16.7	N 8	07.2	13.6	54.3	0	17	47	18	09	18	34	
07		289	04.5		30.7	342	29.1	16.7	7	53.6	13.7	54.4	S 10	17	59	18	21	18	47	
08		304	04.5		31.4	357	04.8	16.8	7	39.9	13.6	54.4	20	18	12	18	35	19	03	
09		319	04.5		32.1	11	40.6	16.8	7	26.3	13.8	54.4	30	18	27	18	52	19	23	
10		334	04.4		32.8	26	16.4	16.7	7	12.5	13.7	54.4	35	18	35	19	03	19	36	
11		349	04.4		33.6	40	52.1	16.8	6	58.8	13.8	54.4	40	18	45	19	15	19	52	
12		4	04.3	S16	34.3	55	27.9	16.8	N 6	45.0	13.9	54.4	45	18	57	19	30	20	11	
13		19	04.3		35.0	70	03.7	16.9	6	31.1	13.8	54.4	S 50	19	11	19	49	20	37	
14		34	04.3		35.8	84	39.6	16.8	6	17.3	13.9	54.4	52	19	18	19	58	20	51	
15		49	04.2		36.5	99	15.4	16.8	6	03.4	13.9	54.4	54	19	26	20	08	21	06	
16		64	04.2		37.2	113	51.2	16.9	5	49.5	13.9	54.4	56	19	34	20	20	21	26	
17		79	04.1		37.9	128	27.1	16.8	5	35.6	14.0	54.5	58	19	43	20	34	21	50	
18		94	04.1	S16	38.6	143	02.9	16.9	N 5	21.6	14.0	54.5	S 60	19	54	20	50	22	26	
19		109	04.0		39.4	157	38.8	16.9	5	07.6	14.0	54.5		SUN		MOON				
20		124	04.0		40.1	172	14.7	16.8	4	53.6	14.1	54.5	Day	Eqn. of Time		Mer.		Mer. Pass.		
21		139	03.9		40.8	186	50.5	16.9	4	39.5	14.0	54.5		00 ^h 12 ^h		Pass.		Upper Lower		
22		154	03.9		41.5	201	26.4	16.9	4	25.5	14.1	54.5	d	m s		m s		h m		
23		169	03.8		42.3	216	02.3	16.9	N 4	11.4	14.1	54.5	6	16 25		16 24		11 44		
			SD	16.2	d	0.7	SD	14.8	14.8	14.8			7	16 23		16 21		11 44		
												8	16 19		16 17		11 44			

UT	ARIES	VENUS	-4.3	MARS	+1.4	JUPITER	-2.9	SATURN	+0.7	STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
T H U R S D A Y	9 00 47 54.7	226 49.8	N 0 50.2	181 15.0	S 17 31.5	10 08.0	N 13 23.8	74 41.3	S 12 53.8	Acamar	315 12.1	S 40 12.5
	01 62 57.1	241 49.7	49.3	196 15.7	32.0	25 10.8	23.7	89 43.7	53.8	Achernar	335 20.4	S 57 07.0
	02 77 59.6	256 49.6	48.4	211 16.4	32.5	40 13.6	23.6	104 46.2	53.8	Acrux	173 01.7	S 63 13.6
	03 93 02.1	271 49.5	47.4	226 17.2	33.0	55 16.4	23.5	119 48.6	53.8	Adhara	255 06.4	S 29 00.0
	04 108 04.5	286 49.4	46.5	241 17.9	33.5	70 19.2	23.4	134 51.1	53.8	Aldebaran	290 40.4	N 16 33.5
	05 123 07.0	301 49.3	45.6	256 18.6	34.0	85 22.0	23.3	149 53.5	53.8			
	06 138 09.5	316 49.2	N 0 44.6	271 19.3	S 17 34.5	100 24.8	N 13 23.2	164 56.0	S 12 53.8	Alioth	166 14.3	N 55 49.7
	07 153 11.9	331 49.1	43.7	286 20.0	35.0	115 27.6	23.1	179 58.4	53.8	Alkaid	152 53.2	N 49 11.6
	08 168 14.4	346 49.0	42.8	301 20.7	35.5	130 30.4	23.0	195 00.9	53.7	Alnair	27 34.0	S 46 51.0
	09 183 16.8	1 48.8	41.8	316 21.4	36.0	145 33.2	22.9	210 03.3	53.7	Alnilam	275 38.5	S 1 11.1
	10 198 19.3	16 48.7	40.9	331 22.1	36.5	160 36.0	22.8	225 05.8	53.7	Alphard	217 48.8	S 8 45.5
	11 213 21.8	31 48.6	39.9	346 22.8	37.0	175 38.8	22.7	240 08.2	53.7			
	12 228 24.2	46 48.5	N 0 39.0	1 23.5	S 17 37.5	190 41.6	N 13 22.6	255 10.6	S 12 53.7	Alphecca	126 05.0	N 26 38.1
	13 243 26.7	61 48.4	38.1	16 24.2	38.0	205 44.4	22.5	270 13.1	53.7	Alpheratz	357 35.6	N 29 13.5
	14 258 29.2	76 48.3	37.1	31 24.9	38.5	220 47.1	22.4	285 15.5	53.7	Altair	62 01.1	N 8 56.0
	15 273 31.6	91 48.2	36.2	46 25.6	39.0	235 49.9	22.3	300 18.0	53.7	Ankaa	353 07.8	S 42 10.7
	16 288 34.1	106 48.1	35.3	61 26.3	39.5	250 52.7	22.2	315 20.4	53.6	Antares	112 17.4	S 26 29.0
	17 303 36.6	121 48.0	34.3	76 27.0	40.0	265 55.5	22.1	330 22.9	53.6			
	18 318 39.0	136 47.9	N 0 33.4	91 27.7	S 17 40.5	280 58.3	N 13 22.0	345 25.3	S 12 53.6	Arcturus	145 49.2	N 19 03.6
	19 333 41.5	151 47.8	32.4	106 28.5	41.0	296 01.1	21.9	0 27.8	53.6	Atria	107 13.1	S 69 04.3
	20 348 44.0	166 47.6	31.5	121 29.2	41.5	311 03.9	21.8	15 30.2	53.6	Avior	234 15.0	S 59 34.7
	21 3 46.4	181 47.5	30.6	136 29.9	42.0	326 06.7	21.7	30 32.6	53.6	Bellatrix	278 23.7	N 6 22.4
	22 18 48.9	196 47.4	29.6	151 30.6	42.4	341 09.5	21.6	45 35.1	53.6	Betelgeuse	270 52.9	N 7 24.8
	23 33 51.3	211 47.3	28.7	166 31.3	42.9	356 12.3	21.5	60 37.5	53.6			
	F R I D A Y	10 00 48 53.8	226 47.2	N 0 27.7	181 32.0	S 17 43.4	11 15.1	N 13 21.4	75 40.0	S 12 53.5	Canopus	263 52.5
01 63 56.3		241 47.1	26.8	196 32.7	43.9	26 17.9	21.3	90 42.4	53.5	Capella	280 23.0	N 46 01.3
02 78 58.7		256 47.0	25.9	211 33.4	44.4	41 20.6	21.2	105 44.8	53.5	Deneb	49 26.6	N 45 22.1
03 94 01.2		271 46.9	24.9	226 34.1	44.9	56 23.4	21.1	120 47.3	53.5	Denebola	182 26.2	N 14 26.4
04 109 03.7		286 46.7	24.0	241 34.8	45.4	71 26.2	21.0	135 49.7	53.5	Diphda	348 48.0	S 17 51.4
05 124 06.1		301 46.6	23.0	256 35.5	45.9	86 29.0	20.9	150 52.2	53.5			
06 139 08.6		316 46.5	N 0 22.1	271 36.2	S 17 46.4	101 31.8	N 13 20.8	165 54.6	S 12 53.5	Dubhe	193 42.5	N 61 37.2
07 154 11.1		331 46.4	21.1	286 36.9	46.9	116 34.6	20.7	180 57.1	53.4	Elath	278 02.8	N 28 37.6
08 169 13.5		346 46.3	20.2	301 37.6	47.4	131 37.4	20.6	195 59.5	53.4	Eltanin	90 43.1	N 51 29.3
09 184 16.0		1 46.2	19.3	316 38.3	47.9	146 40.2	20.5	211 01.9	53.4	Enif	33 39.7	N 9 59.1
10 199 18.5		16 46.1	18.3	331 39.0	48.4	161 43.0	20.4	226 04.4	53.4	Fomalhaut	15 15.5	S 29 29.9
11 214 20.9		31 45.9	17.4	346 39.7	48.9	176 45.8	20.3	241 06.8	53.4			
12 229 23.4		46 45.8	N 0 16.4	1 40.4	S 17 49.4	191 48.5	N 13 20.2	256 09.3	S 12 53.4	Gacrux	171 53.2	S 57 14.5
13 244 25.8		61 45.7	15.5	16 41.1	49.9	206 51.3	20.1	271 11.7	53.4	Gienah	175 44.9	S 17 40.3
14 259 28.3		76 45.6	14.5	31 41.8	50.3	221 54.1	20.0	286 14.1	53.3	Hadar	148 38.1	S 60 29.1
15 274 30.8		91 45.5	13.6	46 42.5	50.8	236 56.9	19.9	301 16.6	53.3	Hamal	327 52.0	N 23 34.6
16 289 33.2		106 45.3	12.6	61 43.2	51.3	251 59.7	19.8	316 19.0	53.3	Kaus Aust.	83 34.1	S 34 22.5
17 304 35.7		121 45.2	11.7	76 43.9	51.8	267 02.5	19.7	331 21.5	53.3			
18 319 38.2		136 45.1	N 0 10.7	91 44.6	S 17 52.3	282 05.3	N 13 19.6	346 23.9	S 12 53.3	Kochab	137 20.9	N 74 03.4
19 334 40.6		151 45.0	09.8	106 45.3	52.8	297 08.1	19.5	1 26.3	53.3	Markab	13 30.7	N 15 20.1
20 349 43.1		166 44.9	08.9	121 46.0	53.3	312 10.9	19.4	16 28.8	53.3	Menkar	314 06.9	N 4 11.1
21 4 45.6		181 44.8	07.9	136 46.7	53.8	327 13.7	19.3	31 31.2	53.2	Menkent	147 59.2	S 36 29.1
22 19 48.0		196 44.6	07.0	151 47.4	54.3	342 16.4	19.2	46 33.6	53.2	Miaplacidus	221 38.5	S 69 48.5
23 34 50.5		211 44.5	06.0	166 48.1	54.8	357 19.2	19.1	61 36.1	53.2			
S A T U R D A Y		11 00 49 52.9	226 44.4	N 0 05.1	181 48.8	S 17 55.3	12 22.0	N 13 19.0	76 38.5	S 12 53.2	Mirfak	308 29.2
	01 64 55.4	241 44.3	04.1	196 49.5	55.7	27 24.8	18.9	91 41.0	53.2	Nunki	75 49.2	S 26 16.1
	02 79 57.9	256 44.1	03.2	211 50.2	56.2	42 27.6	18.8	106 43.4	53.2	Peacock	53 07.4	S 56 39.7
	03 95 00.3	271 44.0	02.2	226 50.9	56.7	57 30.4	18.7	121 45.8	53.2	Pollux	243 18.4	N 27 58.1
	04 110 02.8	286 43.9	01.3	241 51.6	57.2	72 33.2	18.6	136 48.3	53.1	Procyon	244 51.7	N 5 09.9
	05 125 05.3	301 43.8	N 0 00.3	256 52.2	57.7	87 36.0	18.5	151 50.7	53.1			
	06 140 07.7	316 43.7	S 0 00.6	271 52.9	S 17 58.2	102 38.8	N 13 18.4	166 53.2	S 12 53.1	Rasalhague	95 59.8	N 12 32.7
	07 155 10.2	331 43.5	01.6	286 53.6	58.7	117 41.5	18.3	181 55.6	53.1	Regulus	207 35.6	N 11 51.1
	08 170 12.7	346 43.4	02.5	301 54.3	59.2	132 44.3	18.2	196 58.0	53.1	Rigel	281 04.5	S 8 10.3
	09 185 15.1	1 43.3	03.5	316 55.0	17 59.7	147 47.1	18.1	212 00.5	53.1	Rigel Kent.	139 42.4	S 60 55.9
	10 200 17.6	16 43.2	04.5	331 55.7	18 00.1	162 49.9	18.0	227 02.9	53.1	Sabik	102 04.2	S 15 45.2
	11 215 20.1	31 43.0	05.4	346 56.4	00.6	177 52.7	17.9	242 05.3	53.0			
	12 230 22.5	46 42.9	S 0 06.4	1 57.1	S 18 01.1	192 55.5	N 13 17.8	257 07.8	S 12 53.0	Schedar	349 31.7	N 56 40.3
	13 245 25.0	61 42.8	07.3	16 57.8	01.6	207 58.3	17.7	272 10.2	53.0	Shaula	96 12.1	S 37 07.3
	14 260 27.4	76 42.7	08.3	31 58.5	02.1	223 01.1	17.6	287 12.6	53.0	Sirius	258 26.9	S 16 44.7
	15 275 29.9	91 42.5	09.2	46 59.2	02.6	238 03.9	17.5	302 15.1	53.0	Spica	158 23.7	S 11 17.0
	16 290 32.4	106 42.4	10.2	61 59.9	03.1	253 06.6	17.4	317 17.5	53.0	Suhail	222 47.0	S 43 31.4
	17 305 34.8	121 42.3	11.1	77 00.6	03.5	268 09.4	17.3	332 19.9	52.9			
	18 320 37.3	136 42.2	S 0 12.1	92 01.3	S 18 04.0	283 12.2	N 13 17.2	347 22.4	S 12 52.9	Vega	80 34.2	N 38 48.5
	19 335 39.8	151 42.0	13.0	107 02.0	04.5	298 15.0	17.1	2 24.8	52.9	Zuben'ubi	136 57.5	S 16 08.3
	20 350 42.2	166 41.9	14.0	122 02.7	05.0	313 17.8	17.0	17 27.3	52.9			
	21 5 44.7	181 41.8	15.0	137 03.3	05.5	328 20.6	16.9	32 29.7	52.9		SHA	Mer.Pass.
	22 20 47.2	196 41.7	15.9	152 04.0	06.0	343 23.4	16.8	47 32.1	52.9	Venus	177 53.4	S 8 53
	23 35 49.6	211 41.5	16.9	167 04.7	06.4	358 26.2	16.7	62 34.6	52.8	Mars	132 38.2	S 11 53
	h m										Jupiter	322 21.2
Mer.Pass. 20 41.0		v -0.1	d 0.9	v 0.7	d 0.5	v 2.8	d 0.1	v 2.4	d 0.0	Saturn	26 46.2	S 18 54

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise																
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	9	10	11	12												
	d	h		°	'							°						'	°	'	°	'	h	m	h	m	h	m	h
T H U R S D A Y	9 00	184	03.8	S16	43.0	230	38.2	16.8	N	3	57.3	14.2	54.5	N 72	06	40	08	09	10	00	01	59	03	58	06	04	08	40	
	01	199	03.8		43.7	245	14.0	16.9		3	43.1	14.1	54.6	N 70	06	32	07	51	09	17	02	04	03	54	05	50	08	03	
	02	214	03.7		44.4	259	49.9	16.9		3	29.0	14.2	54.6	68	06	25	07	36	08	48	02	08	03	50	05	38	07	37	
	03	229	03.7		45.1	274	25.8	16.9		3	14.8	14.2	54.6	66	06	20	07	24	08	27	02	11	03	48	05	28	07	18	
	04	244	03.6		45.9	289	01.7	16.8		3	00.6	14.2	54.6	64	06	15	07	13	08	10	02	14	03	45	05	20	07	02	
	05	259	03.6		46.6	303	37.5	16.9		2	46.4	14.3	54.6	62	06	10	07	05	07	56	02	16	03	43	05	13	06	49	
	06	274	03.5	S16	47.3	318	13.4	16.8	N	2	32.1	14.2	54.6	60	06	06	06	57	07	44	02	18	03	42	05	08	06	39	
	07	289	03.5		48.0	332	49.2	16.9		2	17.9	14.3	54.6	N 58	06	02	06	50	07	34	02	20	03	40	05	02	06	29	
	08	304	03.4		48.7	347	25.1	16.8		2	03.6	14.3	54.7	56	05	59	06	44	07	25	02	22	03	39	04	58	06	21	
	09	319	03.4		49.4	362	00.9	16.8		1	49.3	14.3	54.7	54	05	56	06	39	07	17	02	23	03	37	04	54	06	14	
	10	334	03.3		50.2	377	09.8	16.8		1	35.0	14.3	54.7	52	05	53	06	34	07	10	02	25	03	36	04	50	06	07	
	11	349	03.3		50.9	391	12.5	16.8		1	20.7	14.3	54.7	50	05	50	06	29	07	04	02	26	03	35	04	47	06	01	
	12		4	03.2	S16	51.6	45	48.3	16.8	N	1	06.4	14.4	54.7	N 40	05	38	06	10	06	39	02	31	03	31	04	34	05	39
	13	19	03.2		52.3	60	24.1	16.8		0	52.0	14.3	54.7	35	05	32	06	03	06	29	02	33	03	30	04	29	05	30	
	14	34	03.1		53.0	74	59.9	16.8		0	37.7	14.4	54.8	30	05	27	05	56	06	21	02	34	03	28	04	24	05	22	
	15	49	03.0		53.7	89	35.7	16.7		0	23.3	14.4	54.8	20	05	16	05	43	06	06	02	37	03	26	04	16	05	09	
	16	64	03.0		54.4	104	11.4	16.7	N	0	08.9	14.4	54.8	N 10	05	05	05	31	05	53	02	40	03	24	04	10	04	58	
	17	79	02.9		55.2	118	47.1	16.7	S	0	05.5	14.4	54.8	0	04	54	05	19	05	40	02	42	03	22	04	03	04	47	
	18	94	02.9	S16	55.9	133	22.8	16.7	S	0	19.9	14.4	54.8	S 10	04	40	05	06	05	28	02	45	03	20	03	57	04	37	
	19	109	02.8		56.6	147	58.5	16.7		0	34.3	14.4	54.8	20	04	24	04	51	05	14	02	47	03	18	03	51	04	25	
	20	124	02.8		57.3	162	34.2	16.6		0	48.7	14.4	54.9	30	04	02	04	33	04	59	02	50	03	16	03	43	04	13	
	21	139	02.7		58.0	177	09.8	16.6		1	03.1	14.5	54.9	35	03	49	04	22	04	50	02	52	03	15	03	39	04	06	
	22	154	02.7		58.7	191	45.4	16.6		1	17.6	14.4	54.9	40	03	33	04	10	04	39	02	54	03	13	03	34	03	57	
	23	169	02.6	16	59.4	206	21.0	16.6		1	32.0	14.4	54.9	45	03	12	03	54	04	27	02	56	03	12	03	29	03	48	
F R I D A Y	10 00	184	02.6	S17	00.1	220	56.6	16.5	S	1	46.4	14.5	54.9	S 50	02	45	03	34	04	12	02	58	03	10	03	22	03	36	
	01	199	02.5		00.8	235	32.1	16.5		2	00.9	14.4	54.9	52	02	31	03	25	04	05	03	00	03	09	03	19	03	31	
	02	214	02.4		01.5	250	07.6	16.5		2	15.3	14.5	55.0	54	02	15	03	14	03	57	03	01	03	08	03	16	03	25	
	03	229	02.4		02.2	264	43.1	16.4		2	29.8	14.4	55.0	56	01	54	03	02	03	49	03	02	03	07	03	12	03	19	
	04	244	02.3		03.0	279	18.5	16.5		2	44.2	14.5	55.0	58	01	27	02	47	03	39	03	04	03	06	03	08	03	12	
	05	259	02.3		03.7	293	54.0	16.3		2	58.7	14.5	55.0	S 60	00	45	02	30	03	27	03	06	03	05	03	04	03	04	
	06	274	02.2	S17	04.4	308	29.3	16.4	S	3	13.2	14.4	55.0		Lat.		Sunset		Twilight		Moonset				9	10	11	12	
	07	289	02.1		05.1	323	04.7	16.3		3	27.6	14.5	55.1						Civil		Naut.								
	08	304	02.1		05.8	337	40.0	16.3		3	42.1	14.4	55.1																
	09	319	02.0		06.5	352	15.3	16.2		3	56.5	14.5	55.1																
	10	334	02.0		07.2	6	50.5	16.2		4	11.0	14.4	55.1		°		h		h		h		h		h		h		
	11	349	01.9		07.9	21	25.7	16.2		4	25.4	14.4	55.1	N 72	13	27	15	17	16	46	15	05	14	33	13	54	12	51	
	12		4	01.8	S17	08.6	36	00.9	16.1	S	4	39.8	14.5	55.2	N 70	14	10	15	36	16	54	15	05	14	40	14	11	13	30
	13	19	01.8		09.3	50	36.0	16.1		4	54.3	14.4	55.2	68	14	38	15	51	17	01	15	04	14	46	14	25	13	58	
	14	34	01.7		10.0	65	11.1	16.0		5	08.7	14.4	55.2	66	15	00	16	03	17	07	15	04	14	51	14	37	14	19	
	15	49	01.7		10.7	79	46.1	16.0		5	23.1	14.4	55.2	64	15	17	16	13	17	12	15	04	14	55	14	46	14	36	
	16	64	01.6		11.4	94	21.1	16.0		5	37.5	14.4	55.2	62	15	31	16	22	17	17	15	04	14	59	14	55	14	50	
	17	79	01.5		12.1	108	56.1	15.9		5	51.9	14.4	55.3	60	15	42	16	30	17	21	15	04	15	03	15	02	15	02	
	18	94	01.5	S17	12.8	123	31.0	15.8	S	6	06.3	14.4	55.3	N 58	15	53	16	37	17	24	15	03	15	05	15	08	15	12	
	19	109	01.4		13.5	138	05.8	15.8		6	20.7	14.3	55.3	56	16	02	16	43	17	28	15	03	15	08	15	14	15	21	
	20	124	01.4		14.2	152	40.6	15.8		6	35.0	14.4	55.3	54	16	10	16	48	17	31	15	03	15	10	15	19	15	29	
	21	139	01.3		14.9	167	15.4	15.7		6	49.4	14.3	55.3	52	16	17	16	53	17	34	15	03	15	13	15	23	15	36	
	22	154	01.2		15.6	181	50.1	15.7		7	03.7	14.3	55.4	50	16	23	16	58	17	37	15	03	15	15	15	28	15	43	
	23	169	01.2		16.3	196	24.8	15.6		7	18.0	14.3	55.4	45	16	37	17	08	17	43	15	03	15	19	15	37	15	57	
S A T U R D A Y	11 00	184	01.1	S17	17.0	210	59.4	15.5	S	7	32.3	14.3	55.4	N 40	16	48	17	17	17	49	15	02	15	23	15	44	16	09	
	01	199	01.0		17.7	225	33.9	15.5		7	46.6	14.3	55.4	35	16	58	17	25	17	55	15	02	15	26	15	51	16	19	
	02	214	01.0		18.4	240	08.4	15.4		8	00.9	14.2	55.4	30	17	07	17	32	18	01	15	02	15	28	15	57	16	28	
	03	229	00.9		19.1	254	42.8	15.4		8	15.1	14.2	55.5	20	17	22	17	45	18	11	15	02	15	33	16	07	16	43	
	04	244	00.8		19.8	269	17.2	15.3		8	29.3	14.3	55.5	N 10	17	35	17	57	18	22	15	02	15	38	16	16			

220		2023 NOVEMBER 12, 13, 14 (SUN., MON., TUES.)													
UT		ARIES		VENUS -4.3		MARS +1.4		JUPITER -2.9		SATURN +0.7		STARS			
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
d h		° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /
12	00	50 52.1	226 41.4	S 0 17.8	182 05.4	S18 06.9	13 28.9	N13 16.6	77 37.0	S12 52.8	Acamar	315 12.1	S40 12.5		
	01	65 54.6	241 41.3	18.8	197 06.1	07.4	28 31.7	16.5	92 39.4	52.8	Achernar	335 20.4	S57 07.1		
	02	80 57.0	256 41.1	19.7	212 06.8	07.9	43 34.5	16.4	107 41.9	52.8	Acrux	173 01.7	S63 13.6		
	03	95 59.5	271 41.0	. . 20.7	227 07.5	. . 08.4	58 37.3	. . 16.3	122 44.3	. . 52.8	Adhara	255 06.4	S29 00.0		
	04	111 01.9	286 40.9	21.7	242 08.2	08.9	73 40.1	16.2	137 46.7	52.8	Aldebaran	290 40.4	N16 33.5		
05	126 04.4	301 40.7	22.6	257 08.9	09.3	88 42.9	16.1	152 49.2	52.7						
06	141 06.9	316 40.6	S 0 23.6	272 09.6	S18 09.8	103 45.7	N13 16.0	167 51.6	S12 52.7	Alioth	166 14.3	N55 49.7			
07	156 09.3	331 40.5	24.5	287 10.2	10.3	118 48.4	15.9	182 54.0	52.7	Alkaid	152 53.2	N49 11.6			
08	171 11.8	346 40.4	25.5	302 10.9	10.8	133 51.2	15.8	197 56.5	52.7	Alnair	27 34.1	S46 51.0			
SUNDAY	09	186 14.3	1 40.2	. . 26.4	317 11.6	. . 11.3	148 54.0	. . 15.7	212 58.9	. . 52.7	Alnilam	275 38.5	S 1 11.1		
	10	201 16.7	16 40.1	27.4	332 12.3	11.8	163 56.8	15.6	228 01.3	52.7	Alphard	217 48.7	S 8 45.5		
	11	216 19.2	31 40.0	28.4	347 13.0	12.2	178 59.6	15.5	243 03.7	52.6					
	12	231 21.7	46 39.8	S 0 29.3	2 13.7	S18 12.7	194 02.4	N13 15.4	258 06.2	S12 52.6	Alphecca	126 05.0	N26 38.1		
	13	246 24.1	61 39.7	30.3	17 14.4	13.2	209 05.2	15.3	273 08.6	52.6	Alpheratz	357 35.6	N29 13.5		
14	261 26.6	76 39.6	31.3	32 15.1	13.7	224 08.0	15.2	288 11.0	52.6	Altair	62 01.1	N 8 56.0			
15	276 29.0	91 39.4	. . 32.2	47 15.8	. . 14.2	239 10.7	. . 15.1	303 13.5	. . 52.6	Ankaa	353 07.8	S42 10.7			
16	291 31.5	106 39.3	33.2	62 16.4	14.6	254 13.5	15.0	318 15.9	52.6	Antares	112 17.4	S26 29.0			
17	306 34.0	121 39.2	34.1	77 17.1	15.1	269 16.3	14.9	333 18.3	52.5						
18	321 36.4	136 39.0	S 0 35.1	92 17.8	S18 15.6	284 19.1	N13 14.8	348 20.8	S12 52.5	Arcturus	145 49.2	N19 03.6			
19	336 38.9	151 38.9	36.1	107 18.5	16.1	299 21.9	14.7	3 23.2	52.5	Atria	107 13.1	S69 04.3			
20	351 41.4	166 38.7	37.0	122 19.2	16.6	314 24.7	14.6	18 25.6	52.5	Avior	234 15.0	S59 34.7			
21	6 43.8	181 38.6	. . 38.0	137 19.9	. . 17.0	329 27.4	. . 14.5	33 28.1	. . 52.5	Bellatrix	278 23.7	N 6 22.4			
22	21 46.3	196 38.5	39.0	152 20.6	17.5	344 30.2	14.4	48 30.5	52.5	Betelgeuse	270 52.9	N 7 24.8			
23	36 48.8	211 38.3	39.9	167 21.2	18.0	359 33.0	14.3	63 32.9	52.4						
13	00	51 51.2	226 38.2	S 0 40.9	182 21.9	S18 18.5	14 35.8	N13 14.2	78 35.3	S12 52.4	Canopus	263 52.4	S52 42.2		
	01	66 53.7	241 38.1	41.8	197 22.6	18.9	29 38.6	14.1	93 37.8	52.4	Capella	280 22.9	N46 01.3		
	02	81 56.2	256 37.9	42.8	212 23.3	19.4	44 41.4	14.0	108 40.2	52.4	Deneb	49 26.6	N45 22.1		
	03	96 58.6	271 37.8	. . 43.8	227 24.0	. . 19.9	59 44.2	. . 13.9	123 42.6	. . 52.4	Denebola	182 26.2	N14 26.4		
	04	112 01.1	286 37.6	44.7	242 24.7	20.4	74 46.9	13.8	138 45.1	52.3	Diphda	348 48.0	S17 51.4		
05	127 03.5	301 37.5	45.7	257 25.3	20.9	89 49.7	13.7	153 47.5	52.3						
06	142 06.0	316 37.4	S 0 46.7	272 26.0	S18 21.3	104 52.5	N13 13.6	168 49.9	S12 52.3	Dubhe	193 42.5	N61 37.2			
07	157 08.5	331 37.2	47.6	287 26.7	21.8	119 55.3	13.5	183 52.4	52.3	Elnath	278 02.8	N28 37.6			
08	172 10.9	346 37.1	48.6	302 27.4	22.3	134 58.1	13.4	198 54.8	52.3	Eltanin	90 43.1	N51 29.3			
09	187 13.4	1 37.0	. . 49.6	317 28.1	. . 22.8	150 00.9	. . 13.3	213 57.2	. . 52.3	Enif	33 39.8	N 9 59.1			
10	202 15.9	16 36.8	50.5	332 28.8	23.2	165 03.6	13.3	228 59.6	52.2	Fomalhaut	15 15.5	S29 29.9			
11	217 18.3	31 36.7	51.5	347 29.4	23.7	180 06.4	13.2	244 02.1	52.2						
MONDAY	12	232 20.8	46 36.5	S 0 52.5	2 30.1	S18 24.2	195 09.2	N13 13.1	259 04.5	S12 52.2	Gacrux	171 53.2	S57 14.5		
	13	247 23.3	61 36.4	53.4	17 30.8	24.7	210 12.0	13.0	274 06.9	52.2	Gienah	175 44.8	S17 40.3		
	14	262 25.7	76 36.2	54.4	32 31.5	25.1	225 14.8	12.9	289 09.3	52.2	Hadar	148 38.1	S60 29.1		
	15	277 28.2	91 36.1	. . 55.4	47 32.2	. . 25.6	240 17.6	. . 12.8	304 11.8	. . 52.1	Hamal	327 52.0	N23 34.6		
	16	292 30.7	106 36.0	56.4	62 32.8	26.1	255 20.3	12.7	319 14.2	52.1	Kaus Aust.	83 34.1	S34 22.5		
17	307 33.1	121 35.8	57.3	77 33.5	26.5	270 23.1	12.6	334 16.6	52.1						
18	322 35.6	136 35.7	S 0 58.3	92 34.2	S18 27.0	285 25.9	N13 12.5	349 19.1	S12 52.1	Kochab	137 20.9	N74 03.4			
19	337 38.0	151 35.5	0 59.3	107 34.9	27.5	300 28.7	12.4	4 21.5	52.1	Markab	13 30.8	N15 20.1			
20	352 40.5	166 35.4	1 00.2	122 35.6	28.0	315 31.5	12.3	19 23.9	52.0	Menkar	314 06.9	N 4 11.1			
21	7 43.0	181 35.2	. . 01.2	137 36.2	. . 28.4	330 34.3	. . 12.2	34 26.3	. . 52.0	Menkent	147 59.2	S36 29.1			
22	22 45.4	196 35.1	02.2	152 36.9	28.9	345 37.0	12.1	49 28.8	52.0	Miaplacidus	221 38.4	S69 48.5			
23	37 47.9	211 35.0	03.1	167 37.6	29.4	0 39.8	12.0	64 31.2	52.0						
14	00	52 50.4	226 34.8	S 1 04.1	182 38.3	S18 29.9	15 42.6	N13 11.9	79 33.6	S12 52.0	Mirfak	308 29.2	N49 56.8		
	01	67 52.8	241 34.7	05.1	197 39.0	30.3	30 45.4	11.8	94 36.0	51.9	Nunki	75 49.2	S26 16.1		
	02	82 55.3	256 34.5	06.1	212 39.6	30.8	45 48.2	11.7	109 38.5	51.9	Peacock	53 07.4	S56 39.7		
	03	97 57.8	271 34.4	. . 07.0	227 40.3	. . 31.3	60 50.9	. . 11.6	124 40.9	. . 51.9	Pollux	243 18.4	N27 58.1		
	04	113 00.2	286 34.2	08.0	242 41.0	31.7	75 53.7	11.5	139 43.3	51.9	Procyon	244 51.7	N 5 09.9		
05	128 02.7	301 34.1	09.0	257 41.7	32.2	90 56.5	11.4	154 45.7	51.9						
06	143 05.1	316 33.9	S 1 10.0	272 42.3	S18 32.7	105 59.3	N13 11.3	169 48.2	S12 51.8	Rasalhague	95 59.8	N12 32.7			
07	158 07.6	331 33.8	10.9	287 43.0	33.2	121 02.1	11.2	184 50.6	51.8	Regulus	207 35.6	N11 51.1			
08	173 10.1	346 33.6	11.9	302 43.7	33.6	136 04.9	11.1	199 53.0	51.8	Rigel	281 04.5	S 8 10.3			
09	188 12.5	1 33.5	. . 12.9	317 44.4	. . 34.1	151 07.6	. . 11.0	214 55.4	. . 51.8	Rigel Kent.	139 42.4	S60 55.8			
10	203 15.0	16 33.3	13.8	332 45.1	34.6	166 10.4	10.9	229 57.9	51.8	Sabik	102 04.2	S15 45.2			
11	218 17.5	31 33.2	14.8	347 45.7	35.0	181 13.2	10.8	245 00.3	51.7						
12	233 19.9	46 33.1	S 1 15.8	2 46.4	S18 35.5	196 16.0	N13 10.7	260 02.7	S12 51.7	Schedar	349 31.8	N56 40.3			
13	248 22.4	61 32.9	16.8	17 47.1	36.0	211 18.8	10.6	275 05.1	51.7	Shaula	96 12.1	S37 07.3			
14	263 24.9	76 32.8	17.7	32 47.8	36.4	226 21.5	10.5	290 07.5	51.7	Sirius	258 26.9	S16 44.7			
15	278 27.3	91 32.6	. . 18.7	47 48.4	. . 36.9	241 24.3	. . 10.4	305 10.0	. . 51.7	Spica	158 23.6	S11 17.0			
16	293 29.8	106 32.5	19.7	62 49.1	37.4	256 27.1	10.3	320 12.4	51.6	Suhail	222 47.0	S43 31.4			
17	308 32.3	121 32.3	20.7	77 49.8	37.8	271 29.9	10.3	335 14.8	51.6						
18	323 34.7	136 32.2	S 1 21.6	92 50.5	S18 38.3	286 32.7	N13 10.2	350 17.2	S12 51.6	Vega	80 34.2	N38 48.5			
19	338 37.2	151 32.0	22.6	107 51.1	38.8	301 35.4	10.1	5 19.7	51.6	Zuben'ubi	136 57.5	S16 08.3			
20	353 39.6	166 31.8	23.6	122 51.8	39.2	316 38.2	10.0	20 22.1	51.6						
21	8 42.1	181 31.7	. . 24.6	137 52.5	. . 39.7	331 41.0	. . 09.9	35 24.5	. . 51.5						
22	23 44.6	196 31.5	25.6	152 53.1	40.2	346 43.8	09.8	50 26.9	51.5	Venus	174 47.0	h 8 54			
23	38 47.0	211 31.4	26.5	167 53.8	40.6	1 46.6	09.7	65 29.3	51.5	Mars	130 30.7	11 50			
		h m													
Mer. Pass. 20 29.2		v -0.1	d 1.0	v 0.7	d 0.5	v 2.8	d 0.1	v 2.4	d 0.0						

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise							
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	12		13	14	15					
d h	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	°	h m	h m	h m	h m	h m	h m	h m	h m				
SUNDAY	12 00	183 59.4 S17 33.5	200 30.9 13.9	S13 07.9 13.5	55.9	N 72	06 51	08 23	10 30	08 40	08 40	08 40	08 40	08 40	08 40	08 40				
	01	198 59.3	34.2	215 03.8 13.9	13 21.4 13.5	56.0	N 70	06 42	08 02	09 35	08 03	08 03	08 03	08 03	08 03	08 03				
	02	213 59.3	34.9	229 36.7 13.7	13 34.9 13.5	56.0	68	06 34	07 46	09 02	07 37	10 11	08 11	08 11	08 11	08 11				
	03	228 59.2	35.6	244 09.4 13.7	13 48.4 13.3	56.0	66	06 28	07 33	08 38	07 18	09 26	08 26	08 26	08 26	08 26				
	04	243 59.1	36.3	258 42.1 13.6	14 01.7 13.4	56.0	64	06 22	07 22	08 20	07 02	08 56	11 14	08 56	11 14	08 56				
	05	258 59.0	37.0	273 14.7 13.5	14 15.1 13.3	56.1	62	06 17	07 12	08 05	06 49	08 34	10 29	08 34	10 29	08 34				
	06	273 59.0 S17 37.6	287 47.2 13.4	S14 28.4 13.2	56.1	N 58	06 12	07 04	07 52	06 39	08 16	10 00	08 16	10 00	08 16	10 00				
	07	288 58.9	38.3	302 19.6 13.3	14 41.6 13.2	56.1	56	06 04	06 56	07 32	06 21	07 49	09 20	07 49	09 20	07 49				
	08	303 58.8	39.0	316 51.9 13.2	14 54.8 13.2	56.1	54	06 01	06 44	07 23	06 14	07 38	09 05	07 38	09 05	07 38				
	09	318 58.7	39.7	331 24.1 13.2	15 08.0 13.1	56.1	52	05 58	06 39	07 16	06 07	07 28	08 51	07 28	08 51	07 28				
	10	333 58.7	40.4	345 56.3 13.0	15 21.1 13.0	56.2	50	05 54	06 34	07 09	06 01	07 20	08 40	07 20	08 40	07 20				
	11	348 58.6	41.0	0 28.3 13.0	15 34.1 13.0	56.2	45	05 47	06 23	06 54	05 49	07 01	08 16	07 01	08 16	07 01				
	12	3 58.5 S17 41.7	15 00.3 12.9	S15 47.1 12.9	56.2	N 40	05 41	06 14	06 42	05 39	06 47	07 57	09 07	06 47	07 57	09 07				
	13	18 58.4	42.4	29 32.2 12.8	16 00.0 12.8	56.2	35	05 35	06 05	06 32	05 30	06 34	07 41	06 34	07 41	06 34				
	14	33 58.3	43.1	44 04.0 12.6	16 12.8 12.8	56.3	30	05 29	05 58	06 23	05 22	06 23	07 28	06 23	07 28	06 23				
	15	48 58.3	43.7	58 35.6 12.6	16 25.6 12.7	56.3	20	05 18	05 44	06 07	05 09	06 05	07 04	06 05	07 04	06 05				
	16	63 58.2	44.4	73 07.2 12.5	16 38.3 12.7	56.3	N 10	05 06	05 32	05 54	04 58	05 49	06 45	05 49	06 45	05 49				
	17	78 58.1	45.1	87 38.7 12.4	16 51.0 12.5	56.3	0	04 54	05 19	05 41	04 47	05 34	06 26	05 34	06 26	05 34				
	18	93 58.0 S17 45.8	102 10.1 12.4	S17 03.5 12.6	56.4	S 10	04 39	05 05	05 28	04 37	05 20	06 08	07 01	05 20	06 08	07 01				
	19	108 57.9	46.4	116 41.5 12.2	17 16.1 12.4	56.4	20	04 22	04 50	05 13	04 25	05 04	05 48	04 25	05 04	05 48				
	20	123 57.9	47.1	131 12.7 12.1	17 28.5 12.4	56.4	30	04 00	04 31	04 57	04 13	04 46	05 26	04 13	04 46	05 26				
	21	138 57.8	47.8	145 43.8 12.0	17 40.9 12.3	56.4	35	03 46	04 20	04 48	04 06	04 36	05 12	04 06	04 36	05 12				
	22	153 57.7	48.5	160 14.8 11.9	17 53.2 12.2	56.5	40	03 29	04 06	04 37	03 57	04 24	04 57	03 57	04 24	04 57				
	23	168 57.6	49.1	174 45.7 11.8	18 05.4 12.2	56.5	45	03 08	03 50	04 24	03 48	04 11	04 40	03 48	04 11	04 40				
MONDAY	13 00	183 57.5 S17 49.8	189 16.5 11.7	S18 17.6 12.1	56.5	S 50	02 39	03 29	04 08	03 36	03 54	04 18	04 51	03 54	04 18	04 51				
	01	198 57.4	50.5	203 47.2 11.6	18 29.7 12.0	56.5	52	02 24	03 19	04 00	03 31	03 46	04 07	03 31	03 46	04 07				
	02	213 57.4	51.1	218 17.8 11.6	18 41.7 11.9	56.5	54	02 06	03 08	03 52	03 25	03 38	03 55	03 25	03 38	03 55				
	03	228 57.3	51.8	232 48.4 11.4	18 53.6 11.8	56.6	56	01 43	02 55	03 43	03 19	03 28	03 42	03 19	03 28	03 42				
	04	243 57.2	52.5	247 18.8 11.3	19 05.4 11.8	56.6	58	01 12	02 39	03 32	03 12	03 17	03 27	03 12	03 17	03 27				
	05	258 57.1	53.2	261 49.1 11.2	19 17.2 11.6	56.6	S 60	00 09	02 20	03 20	03 04	03 05	03 08	03 04	03 05	03 08				
	06	273 57.0 S17 53.8	276 19.3 11.1	S19 28.8 11.6	56.6	Lat.		Sunset		Twilight		Moonset								
	07	288 56.9	54.5	290 49.4 11.0	19 40.4 11.5	56.7			Civil		Naut.		12	13	14	15				
	08	303 56.9	55.2	305 19.4 10.8	19 51.9 11.4	56.7							h m	h m	h m	h m				
	09	318 56.8	55.8	319 49.2 10.8	20 03.3 11.3	56.7														
	10	333 56.7	56.5	334 19.0 10.7	20 14.6 11.3	56.7														
	11	348 56.6	57.2	348 48.7 10.6	20 25.9 11.1	56.8														
	12	3 56.5 S17 57.8	3 18.3 10.4	S20 37.0 11.0	56.8	N 72	12 58	15 04	16 36	12 51	12 51	12 51	12 51	12 51	12 51	12 51				
	13	18 56.4	58.5	17 47.7 10.4	20 48.0 11.0	56.8	N 70	13 53	15 25	16 45	13 30	13 30	13 30	13 30	13 30	13 30				
	14	33 56.3	59.1	32 17.1 10.2	20 59.0 10.8	56.8	68	14 25	15 41	16 53	13 58	13 04	13 04	13 04	13 04	13 04				
	15	48 56.2	59.8	46 46.3 10.2	21 09.8 10.7	56.9	66	14 49	15 55	17 00	14 19	13 51	13 51	13 51	13 51	13 51				
	16	63 56.2	17 59.8	61 15.5 10.0	21 20.5 10.7	56.9	64	15 08	16 06	17 06	14 36	14 21	13 53	14 21	13 53	14 21				
	17	78 56.1	01.1	75 44.5 9.9	21 31.2 10.5	56.9	62	15 23	16 16	17 11	14 50	14 44	14 38	14 38	14 38	14 38				
	18	93 56.0 S18 01.8	90 13.4 9.9	S21 41.7 10.4	56.9	60	15 36	16 24	17 15	15 02	15 03	15 08	15 08	15 03	15 08	15 03				
	19	108 55.9	02.5	104 42.3 9.7	21 52.1 10.4	56.9	N 58	15 47	16 31	17 19	15 12	15 19	15 31	15 19	15 31	15 19				
	20	123 55.8	03.1	119 11.0 9.6	22 02.5 10.2	57.0	56	15 56	16 38	17 23	15 21	15 32	15 49	15 21	15 32	15 49				
	21	138 55.7	03.8	133 39.6 9.5	22 12.7 10.1	57.0	54	16 05	16 44	17 27	15 29	15 44	16 05	15 29	15 44	16 05				
	22	153 55.6	04.4	148 08.1 9.3	22 22.8 10.0	57.0	52	16 12	16 49	17 30	15 36	15 54	16 19	15 36	15 54	16 19				
	23	168 55.5	05.1	162 36.4 9.3	22 32.8 9.9	57.0	50	16 19	16 54	17 33	15 43	16 03	16 31	15 43	16 03	16 31				
TUESDAY	14 00	183 55.4 S18 05.8	177 04.7 9.2	S22 42.7 9.7	57.1	45	16 34	17 05	17 41	15 57	16 23	16 55	17 39	16 23	16 55	17 39				
	01	198 55.3	06.4	191 32.9 9.1	22 52.4 9.7	57.1	N 40	16 46	17 14	17 47	16 09	16 39	17 15	16 09	16 39	17 15				
	02	213 55.2	07.1	206 01.0 8.9	23 02.1 9.5	57.1	35	16 56	17 23	17 53	16 19	16 52	17 32	16 19	16 52	17 32				
	03	228 55.1	07.7	220 28.9 8.8	23 11.6 9.4	57.1	30	17 05	17 30	17 59	16 28	17 04	17 46	16 28	17 04	17 46				
	04	243 55.1	08.4	234 56.7 8.8	23 21.0 9.3	57.1	20	17 21	17 44	18 10	16 43	17 24	18 11	16 43	17 24	18 11				
	05	258 55.0	09.0	249 24.5 8.6	23 30.3 9.2	57.2	N 10	17 35	17 57	18 22	16 57	17 42	18 32	16 57	17 42	18 32				
	06	273 54.9 S18 09.7	263 52.1 8.5	S23 39.5 9.1	57.2	0	17 48	18 10	18 35	17 09	17 59	18 52	19 50	17 09	17 59	18 52				
	07	288 54.8	10.3	278 19.6 8.5	23 48.6 8.9	57.2	S 10	18 01	18 23	18 49	17 22	18 15	19 12	17 22	18 15	19 12				
	08	303 54.7	11.0	292 47.1 8.3	23 57.5 8.8	57.2	20	18 15	18 39	19 07	17 36	18 33	19 34	17 36	18 33	19 34				
	09	318 54.6	11.7	307 14.4 8.2	24 06.3 8.7	57.3	30	18 32	18 58	19 29	17 51	18 54	19 59	17 51	18 54	19 59				
	10	333 54.5	12.3	321 41.6 8.1	24 15.0 8.5	57.3	35	18 41	19 09	19 43	18 00	19 06	20 14	18 00	19 06	20 14				
	11	348 54.4	13.0	336 08.7 8.0	24 23.5 8.4	57.3	40	18 52	19 23	20 00	18 11	19 20	20 31	18 11	19 20	20 31				
	12	3 54.3 S18 13.6	350 35.7 7.9	S24 31.9 8.3	57.3	45	19 06	19 39	20 22	18 23	19 37	20 51	22 03	18 23	19 37	20 51				
	13	18 54.2	14.3	5 02.6 7.7	24 40.2 8.1	57.3	S 50	19 22	20 00	20 51	18 38	19 58	21 17	18 38	19 58	21 17				
	14	33 54.1	14.9	19 29.3 7.7	24 48.3 8.0	57.4	52	19 29	20 11	21 07	18 45	20 07	21 30	18 45	20 07	21 30				
15	48 54.0	15.6	33 56.0 7.6	24 56.3 7.9	57.4	54	19 38	20 22	21 25	18 53	20 19	21 45	18 53	20 19	21 45					
16	63 53.9	16.2	48 22.6 7.5	25 04.2 7.7	57.4	56	19 47	20 36	21 48	19 02	20 31	22 02	19 02	20 31	22 02					
17	78 53.8	16.9	62 49.1 7.4	25 11.9 7.6	57.4	58	19 58	20 52	22 21	19 12	20 46	22 22	19 12	20 46	22 22					
18	93 53.7 S18 17.5</																			

UT		ARIES		VENUS -4.3		MARS +1.4		JUPITER -2.9		SATURN +0.7		STARS						
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec			
WEDNESDAY	15 00	53 49.5	226 31.2	S 1 27.5	182 54.5	S18 41.1	16 49.3	N13 09.6	80 31.8	S12 51.5	Acamar	315 12.1	S40 12.5					
	01	68 52.0	241 31.1	28.5	197 55.2	41.6	31 52.1	09.5	95 34.2	51.5	Achernar	335 20.4	S57 07.1					
	02	83 54.4	256 30.9	29.5	212 55.8	42.0	46 54.9	09.4	110 36.6	51.4	Acrux	173 01.7	S63 13.6					
	03	98 56.9	271 30.8	30.4	227 56.5	42.5	61 57.7	09.3	125 39.0	51.4	Adhara	255 06.4	S29 00.0					
	04	113 59.4	286 30.6	31.4	242 57.2	43.0	77 00.4	09.2	140 41.5	51.4	Aldebaran	290 40.4	N16 33.5					
	05	129 01.8	301 30.5	32.4	257 57.9	43.4	92 03.2	09.1	155 43.9	51.4								
	06	144 04.3	316 30.3	S 1 33.4	272 58.5	S18 43.9	107 06.0	N13 09.0	170 46.3	S12 51.3	Alioth	166 14.3	N55 49.7					
	07	159 06.8	331 30.2	34.4	287 59.2	44.4	122 08.8	08.9	185 48.7	51.3	Alkaid	152 53.2	N49 11.6					
	08	174 09.2	346 30.0	35.3	302 59.9	44.8	137 11.6	08.8	200 51.1	51.3	Alnair	27 34.1	S46 51.0					
	09	189 11.7	1 29.8	36.3	318 00.5	45.3	152 14.3	08.7	215 53.6	51.3	Alnilam	275 38.4	S 1 11.1					
	10	204 14.1	16 29.7	37.3	333 01.2	45.7	167 17.1	08.6	230 56.0	51.3	Alphard	217 48.7	S 8 45.5					
	11	219 16.6	31 29.5	38.3	348 01.9	46.2	182 19.9	08.5	245 58.4	51.2								
	12	234 19.1	46 29.4	S 1 39.3	3 02.5	S18 46.7	197 22.7	N13 08.4	261 00.8	S12 51.2	Alphecca	126 04.9	N26 38.1					
	13	249 21.5	61 29.2	40.2	18 03.2	47.1	212 25.4	08.3	276 03.2	51.2	Alpheratz	357 35.6	N29 13.5					
	14	264 24.0	76 29.1	41.2	33 03.9	47.6	227 28.2	08.2	291 05.6	51.2	Altair	62 01.1	N 8 56.0					
	15	279 26.5	91 28.9	42.2	48 04.6	48.1	242 31.0	08.2	306 08.1	51.2	Ankaa	353 07.8	S42 10.7					
	16	294 28.9	106 28.7	43.2	63 05.2	48.5	257 33.8	08.1	321 10.5	51.1	Antares	112 17.4	S26 29.0					
	17	309 31.4	121 28.6	44.2	78 05.9	49.0	272 36.6	08.0	336 12.9	51.1								
	18	324 33.9	136 28.4	S 1 45.1	93 06.6	S18 49.4	287 39.3	N13 07.9	351 15.3	S12 51.1	Arcturus	145 49.1	N19 03.5					
	19	339 36.3	151 28.3	46.1	108 07.2	49.9	302 42.1	07.8	6 17.7	51.1	Atria	107 13.1	S69 04.2					
	20	354 38.8	166 28.1	47.1	123 07.9	50.4	317 44.9	07.7	21 20.2	51.0	Avior	234 14.9	S59 34.8					
	21	9 41.3	181 28.0	48.1	138 08.6	50.8	332 47.7	07.6	36 22.6	51.0	Bellatrix	278 23.6	N 6 22.4					
	22	24 43.7	196 27.8	49.1	153 09.2	51.3	347 50.4	07.5	51 25.0	51.0	Betelgeuse	270 52.9	N 7 24.8					
	23	39 46.2	211 27.6	50.1	168 09.9	51.7	2 53.2	07.4	66 27.4	51.0								
THURSDAY	16 00	54 48.6	226 27.5	S 1 51.0	183 10.6	S18 52.2	17 56.0	N13 07.3	81 29.8	S12 51.0	Canopus	263 52.4	S52 42.2					
	01	69 51.1	241 27.3	52.0	198 11.2	52.7	32 58.8	07.2	96 32.2	50.9	Capella	280 22.9	N46 01.3					
	02	84 53.6	256 27.1	53.0	213 11.9	53.1	48 01.5	07.1	111 34.7	50.9	Deneb	49 26.6	N45 22.1					
	03	99 56.0	271 27.0	54.0	228 12.6	53.6	63 04.3	07.0	126 37.1	50.9	Denebola	182 26.1	N14 26.4					
	04	114 58.5	286 26.8	55.0	243 13.2	54.0	78 07.1	06.9	141 39.5	50.9	Diphda	348 48.0	S17 51.4					
	05	130 01.0	301 26.7	56.0	258 13.9	54.5	93 09.9	06.8	156 41.9	50.8								
	06	145 03.4	316 26.5	S 1 56.9	273 14.6	S18 54.9	108 12.6	N13 06.7	171 44.3	S12 50.8	Dubhe	193 42.4	N61 37.1					
	07	160 05.9	331 26.3	57.9	288 15.2	55.4	123 15.4	06.6	186 46.7	50.8	Elnath	278 02.8	N28 37.6					
	08	175 08.4	346 26.2	58.9	303 15.9	55.9	138 18.2	06.5	201 49.2	50.8	Eltanin	90 43.1	N51 29.3					
	09	190 10.8	1 26.0	1 59.9	318 16.6	56.3	153 21.0	06.4	216 51.6	50.7	Enif	33 39.8	N 9 59.1					
	10	205 13.3	16 25.8	2 00.9	333 17.2	56.8	168 23.7	06.4	231 54.0	50.7	Fomalhaut	15 15.5	S29 29.9					
	11	220 15.8	31 25.7	01.9	348 17.9	57.2	183 26.5	06.3	246 56.4	50.7								
	12	235 18.2	46 25.5	S 2 02.9	3 18.5	S18 57.7	198 29.3	N13 06.2	261 58.8	S12 50.7	Gacrux	171 53.2	S57 14.5					
	13	250 20.7	61 25.3	03.8	18 19.2	58.1	213 32.1	06.1	277 01.2	50.7	Gienah	175 44.8	S17 40.3					
	14	265 23.1	76 25.2	04.8	33 19.9	58.6	228 34.8	06.0	292 03.7	50.6	Hadar	148 38.0	S60 29.1					
	15	280 25.6	91 25.0	05.8	48 20.5	59.1	243 37.6	05.9	307 06.1	50.6	Hamal	327 52.0	N23 34.6					
	16	295 28.1	106 24.9	06.8	63 21.2	18 59.5	258 40.4	05.8	322 08.5	50.6	Kaus Aust.	83 34.1	S34 22.5					
	17	310 30.5	121 24.7	07.8	78 21.9	19 00.0	273 43.2	05.7	337 10.9	50.6								
	18	325 33.0	136 24.5	S 2 08.8	93 22.5	S19 00.4	288 45.9	N13 05.6	352 13.3	S12 50.5	Kochab	137 20.9	N74 03.4					
	19	340 35.5	151 24.4	09.8	108 23.2	00.9	303 48.7	05.5	7 15.7	50.5	Markab	13 30.8	N15 20.1					
	20	355 37.9	166 24.2	10.8	123 23.8	01.3	318 51.5	05.4	22 18.1	50.5	Menkar	314 06.8	N 4 11.1					
	21	10 40.4	181 24.0	11.7	138 24.5	01.8	333 54.2	05.3	37 20.6	50.5	Menkent	147 59.2	S36 29.1					
	22	25 42.9	196 23.8	12.7	153 25.2	02.2	348 57.0	05.2	52 23.0	50.4	Miaplacidus	221 38.4	S69 48.5					
	23	40 45.3	211 23.7	13.7	168 25.8	02.7	3 59.8	05.1	67 25.4	50.4								
FRIDAY	17 00	55 47.8	226 23.5	S 2 14.7	183 26.5	S19 03.1	19 02.6	N13 05.0	82 27.8	S12 50.4	Mirfak	308 29.2	N49 56.8					
	01	70 50.3	241 23.3	15.7	198 27.1	03.6	34 05.3	05.0	97 30.2	50.4	Nunki	75 49.2	S26 16.1					
	02	85 52.7	256 23.2	16.7	213 27.8	04.0	49 08.1	04.9	112 32.6	50.3	Peacock	53 07.5	S56 39.7					
	03	100 55.2	271 23.0	17.7	228 28.5	04.5	64 10.9	04.8	127 35.0	50.3	Pollux	243 18.3	N27 58.1					
	04	115 57.6	286 22.8	18.7	243 29.1	05.0	79 13.7	04.7	142 37.4	50.3	Procyon	244 51.7	N 5 09.9					
	05	131 00.1	301 22.7	19.7	258 29.8	05.4	94 16.4	04.6	157 39.9	50.3								
	06	146 02.6	316 22.5	S 2 20.6	273 30.4	S19 05.9	109 19.2	N13 04.5	172 42.3	S12 50.2	Rasalhague	95 59.8	N12 32.6					
	07	161 05.0	331 22.3	21.6	288 31.1	06.3	124 22.0	04.4	187 44.7	50.2	Regulus	207 35.5	N11 51.1					
	08	176 07.5	346 22.1	22.6	303 31.8	06.8	139 24.7	04.3	202 47.1	50.2	Rigel	281 04.5	S 8 10.3					
	09	191 10.0	1 22.0	23.6	318 32.4	07.2	154 27.5	04.2	217 49.5	50.2	Rigel Kent.	139 42.3	S60 55.8					
	10	206 12.4	16 21.8	24.6	333 33.1	07.7	169 30.3	04.1	232 51.9	50.1	Sabik	102 04.2	S15 45.2					
	11	221 14.9	31 21.6	25.6	348 33.7	08.1	184 33.0	04.0	247 54.3	50.1								
	12	236 17.4	46 21.5	S 2 26.6	3 34.4	S19 08.6	199 35.8	N13 03.9	262 56.7	S12 50.1	Schedar	349 31.8	N56 40.3					
	13	251 19.8	61 21.3	27.6	18 35.0	09.0	214 38.6	03.8	277 59.1	50.1	Shaula	96 12.1	S37 07.3					
	14	266 22.3	76 21.1	28.6	33 35.7	09.5	229 41.4	03.7	293 01.6	50.0	Sirius	258 26.9	S16 44.7					
	15	281 24.8	91 20.9	29.6	48 36.4	09.9	244 44.1	03.7	308 04.0	50.0	Spica	158 23.6	S11 17.0					
	16	296 27.2	106 20.8	30.6	63 37.0	10.4	259 46.9	03.6	323 06.4	50.0	Suhail	222 47.0	S43 31.4					
	17	311 29.7	121 20.6	31.5	78 37.7	10.8	274 49.7	03.5	338 08.8	50.0								
	18	326 32.1	136 20.4	S 2 32.5	93 38.3	S19 11.3	289 52.4	N13 03.4	353 11.2	S12 49.9	Vega	80 34.2	N38 48.5					
	19	341 34.6	151 20.2	33.5	108 39.0	11.7	304 55.2	03.3	8 13.6	49.9	Zuben'ubi	136 57.4	S16 08.3					
	20	356 37.1	166 20.1	34.5	123 39.6	12.2	319 58.0	03.2	23 16.0	49.9								
	21	11 39.5	181 19.9	35.5	138 40.3	12.6	335 00.7	03.1	38 18.4	49.9								
	22	26 42.0	196 19.7	36.5	153 41.0	13.1	350 03.5	03.0	53 20.8	49.8	Venus	171 38.8	h 54					
	23	41 44.5	211 19.5	37.5	168 41.6	13.5	5 06.3	02.9	68 23.2	49.8	Mars	128 21.9	h 47					
Mer. Pass. 20 17.4		v -0.2 d 1.0			v 0.7 d 0.5			v 2.8 d 0.1			v 2.4 d 0.0			Saturn			26 41.2	18 31

UT	SUN		MOON						Lat.	Twilight		Sunrise	Moonrise							
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	15		16	17	18					
d h	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	°	h m	h m	h m	h m	h m	h m	h m	h m				
1500	183	53.1	S18	21.4	163	51.7	6.7	S26	02.0	6.6	57.6	N 72	07 02	08 38	11 19					
	198	53.0		22.0	178	17.4	6.6	26	08.6	6.4	57.6	N 70	06 51	08 14	09 54					
	213	52.9		22.7	192	43.0	6.5	26	15.0	6.3	57.6	68	06 43	07 56	09 16					
	228	52.8		23.3	207	08.5	6.5	26	21.3	6.1	57.6	66	06 35	07 42	08 50					
	243	52.7		24.0	221	34.0	6.3	26	27.4	5.9	57.6	64	06 29	07 30	08 30				15 20	
04	258	52.6		24.6	235	59.3	6.3	26	33.3	5.8	57.7	62	06 23	07 19	08 13	12 41		14 48	14 36	
05	273	52.5	S18	25.2	250	24.6	6.1	S26	39.1	5.6	57.7	60	06 18	07 10	08 00	11 45	13 10	13 52	14 06	
WEDNESDAY	06	288	52.4	25.9	264	49.7	6.1	26	44.7	5.5	57.7	N 58	06 14	07 02	07 48	11 13	12 31	13 19	13 44	
	07	303	52.3	26.5	279	14.8	6.0	26	50.2	5.3	57.7	56	06 10	06 55	07 38	10 48	12 03	12 54	13 25	
	08	318	52.2	27.2	293	39.8	6.0	26	55.5	5.2	57.7	54	06 06	06 49	07 29	10 29	11 41	12 35	13 09	
	09	333	52.1	27.8	308	04.8	5.8	27	00.7	5.0	57.8	52	06 02	06 43	07 21	10 13	11 24	12 18	12 56	
	10	348	52.0	28.4	322	29.6	5.8	27	05.7	4.8	57.8	50	05 59	06 38	07 14	09 58	11 08	12 04	12 44	
	11	3	51.9	S18	29.1	336	54.4	5.7	S27	10.5	4.6	57.8	45	05 51	06 27	06 58	09 30	10 38	11 34	12 19
	12	18	51.8	29.7	351	19.1	5.6	27	15.1	4.5	57.8	N 40	05 44	06 17	06 46	09 07	10 14	11 12	11 59	
	13	33	51.7	30.4	5	43.7	5.5	27	19.6	4.4	57.8	35	05 37	06 08	06 35	08 49	09 54	10 53	11 43	
	14	48	51.6	31.0	20	08.2	5.5	27	24.0	4.1	57.9	30	05 31	06 00	06 26	08 33	09 37	10 36	11 28	
	15	63	51.5	31.6	34	32.7	5.4	27	28.1	4.0	57.9	20	05 19	05 46	06 09	08 06	09 09	10 09	11 04	
	16	78	51.3	32.3	48	57.1	5.4	27	32.1	3.8	57.9	N 10	05 07	05 33	05 55	07 43	08 44	09 45	10 43	
	17	93	51.2	S18	32.9	63	21.5	5.2	S27	35.9	3.7	57.9	0	04 54	05 19	05 41	07 22	08 22	09 23	10 23
	18	108	51.1	33.5	77	45.7	5.2	27	39.6	3.4	57.9	S 10	04 39	05 05	05 27	07 01	07 59	09 01	10 03	
	19	123	51.0	34.2	92	09.9	5.2	27	43.0	3.3	58.0	20	04 21	04 49	05 13	06 38	07 35	08 37	09 41	
	20	138	50.9	34.8	106	34.1	5.1	27	46.3	3.1	58.0	30	03 58	04 29	04 56	06 12	07 07	08 09	09 16	
	21	153	50.8	35.4	120	58.2	5.0	27	49.4	3.0	58.0	35	03 44	04 18	04 46	05 57	06 50	07 53	09 02	
	22	168	50.7	36.1	135	22.2	5.0	27	52.4	2.7	58.0	40	03 26	04 03	04 34	05 39	06 31	07 34	08 44	
	23	183	50.6	S18	36.7	149	46.2	4.9	S27	55.1	2.6	58.0	45	03 03	03 46	04 20	05 18	06 07	07 10	08 24
1600	00	198	50.5	37.3	164	10.1	4.9	27	57.7	2.5	58.0	S 50	02 33	03 25	04 04	04 51	05 37	06 41	07 58	
	01	213	50.4	38.0	178	34.0	4.8	28	00.2	2.2	58.1	52	02 17	03 14	03 56	04 38	05 23	06 26	07 45	
	02	228	50.3	38.6	192	57.8	4.8	28	02.4	2.0	58.1	54	01 57	03 02	03 47	04 23	05 05	06 09	07 31	
	03	243	50.1	39.2	207	21.6	4.8	28	04.4	1.9	58.1	56	01 32	02 48	03 37	04 05	04 45	05 48	07 14	
	04	258	50.0	39.8	221	45.4	4.7	28	06.3	1.7	58.1	58	00 55	02 31	03 26	03 44	04 19	05 23	06 53	
	05	273	49.9	S18	40.5	236	09.1	4.6	S28	08.0	1.5	58.1	S 60	////	02 10	03 13	03 17	03 43	04 47	06 27
	06	288	49.8	41.1	250	32.7	4.7	28	09.5	1.3	58.1	Lat.	Sunset	Twilight		Moonset				
	07	303	49.7	41.7	264	56.4	4.6	28	10.8	1.2	58.2	Civil	Naut.	15	16	17	18			
	08	318	49.6	42.4	279	20.0	4.5	28	12.0	1.0	58.2	h m	h m	h m	h m	h m	h m	h m		
	09	333	49.5	43.0	293	43.5	4.5	28	13.0	0.7	58.2	N 72	12 09	14 51	16 26					
	10	348	49.4	43.6	308	07.0	4.5	28	13.7	0.6	58.2	N 70	13 34	15 14	16 37					
	11	3	49.2	S18	44.2	322	30.5	4.5	S28	14.3	0.5	58.2	68	14 12	15 32	16 45				
	12	18	49.1	44.9	336	54.0	4.5	28	14.8	0.2	58.2	66	14 39	15 47	16 53					
	13	33	49.0	45.5	351	17.5	4.4	28	15.0	0.0	58.3	64	14 59	15 59	16 59				18 06	
	14	48	48.9	46.1	5	40.9	4.4	28	15.0	0.1	58.3	62	15 15	16 09	17 05	14 25		16 32	18 49	
	15	63	48.8	46.7	20	04.3	4.4	28	14.9	0.3	58.3	60	15 29	16 18	17 10	15 22	16 02	17 28	19 18	
	16	78	48.7	47.3	34	27.7	4.4	28	14.6	0.6	58.3	N 58	15 41	16 26	17 15	15 54	16 42	18 01	19 40	
	17	93	48.6	S18	48.0	48	51.1	4.4	S28	14.0	0.6	58.3	56	15 51	16 33	17 19	16 19	17 10	18 25	19 58
	18	108	48.4	48.6	63	14.5	4.4	28	13.4	0.9	58.3	54	16 00	16 40	17 23	16 39	17 31	18 45	20 13	
	19	123	48.3	49.2	77	37.9	4.4	28	12.5	1.1	58.4	52	16 08	16 45	17 27	16 55	17 49	19 01	20 26	
	20	138	48.2	49.8	92	01.3	4.3	28	11.4	1.3	58.4	50	16 15	16 51	17 30	17 10	18 04	19 15	20 37	
	21	153	48.1	50.4	106	24.6	4.4	28	10.1	1.4	58.4	45	16 30	17 02	17 38	17 39	18 35	19 44	21 01	
	22	168	48.0	51.1	120	48.0	4.4	28	08.7	1.6	58.4	N 40	16 43	17 12	17 45	18 02	18 59	20 06	21 20	
	1700	00	198	47.7	52.3	149	34.7	4.4	28	05.3	2.0	58.4	35	16 54	17 21	17 52	18 21	19 19	20 25	21 36
01		213	47.6	52.9	163	58.1	4.4	28	03.3	2.2	58.4	30	17 04	17 29	17 58	18 37	19 36	20 41	21 49	
02		228	47.5	53.5	178	21.5	4.4	28	01.1	2.4	58.5	20	17 20	17 43	18 10	19 04	20 04	21 07	22 12	
03		243	47.4	54.1	192	44.9	4.4	27	58.7	2.5	58.5	N 10	17 35	17 57	18 22	19 28	20 28	21 30	22 32	
04		258	47.3	54.8	207	08.3	4.4	27	56.2	2.8	58.5	0	17 48	18 10	18 36	19 50	20 51	21 52	22 50	
05		273	47.1	S18	55.4	221	31.7	4.5	S27	53.4	2.9	58.5	S 10	18 02	18 24	18 51	20 12	21 13	22 13	23 09
06		288	47.0	56.0	235	55.2	4.4	27	50.5	3.1	58.5	20	18 17	18 41	19 09	20 36	21 38	22 36	23 28	
07		303	46.9	56.6	250	18.6	4.5	27	47.4	3.3	58.5	30	18 34	19 00	19 32	21 04	22 06	23 02	23 50	
08		318	46.8	57.2	264	42.1	4.6	27	44.1	3.5	58.5	35	18 44	19 12	19 47	21 20	22 22	23 17	24 03	
09		333	46.7	57.8	279	05.7	4.5	27	40.6	3.6	58.6	40	18 56	19 27	20 05	21 39	22 42	23 35	24 18	
10		348	46.5	58.4	293	29.2	4.6	27	37.0	3.9	58.6	45	19 10	19 44	20 27	22 03	23 05	23 56	24 36	
11		3	46.4	S18	59.0	307	52.8	4.6	S27	33.1	4.0	58.6	S 50	19 27	20 06	20 59	22 32	23 35	24 23	00 23
12		18	46.3	18 59.7	322	16.4	4.6	27	29.1	4.2	58.6	52	19 35	20 17	21 15	22 47	23 50	24 36	00 36	
13		33	46.2	19 00.3	336	40.0	4.7	27	24.9	4.4	58.6	54	19 43	20 29	21 35	23 04	24 07	00 07	00 51	
14		48	46.0	00.9	351	03.7	4.7	27	20.5	4.5	58.6	56	19 54	20 43	22 01	23 24	24 28	00 28	01 08	
15		63	45.9	01.5	5	27.4	4.8	27	16.0	4.8	58.6	58	20 05	21 01	22 40	23 50	24 54	00 54	01 29	
16		78	45.8	02.1	19	51.2	4.8	27	11.2	4.9	58.6	S 60	20 18	21 22	////	24 26	00 26	01 29	01 56	
17		93	45.7	S19	02.7	34	15.0	4.8	S27	06.3	5.1	58.7	Day	SUN		MOON				

UT		ARIES			VENUS -4.3			MARS +1.3			JUPITER -2.9			SATURN +0.8			STARS		
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
SATURDAY	1800	56 46.9	226 19.4 S	2 38.5	183 42.3 S	19 14.0	20 09.1 N	13 02.8	83 25.7 S	12 49.8	Acamar	315 12.1 S	40 12.5						
	01	71 49.4	241 19.2	39.5	198 42.9	14.4	35 11.8	02.7	98 28.1	49.8	Achernar	335 20.4 S	57 07.1						
	02	86 51.9	256 19.0	40.5	213 43.6	14.9	50 14.6	02.6	113 30.5	49.7	Acrux	173 01.6 S	63 13.6						
	03	101 54.3	271 18.8	41.5	228 44.2	15.3	65 17.4	02.5	128 32.9	49.7	Adhara	255 06.4 S	29 00.0						
	04	116 56.8	286 18.6	42.5	243 44.9	15.7	80 20.1	02.5	143 35.3	49.7	Aldebaran	290 40.4 N	16 33.5						
	05	131 59.2	301 18.5	43.5	258 45.6	16.2	95 22.9	02.4	158 37.7	49.7									
	06	147 01.7	316 18.3 S	2 44.5	273 46.2 S	19 16.6	110 25.7 N	13 02.3	173 40.1 S	12 49.6	Alioth	166 14.2 N	55 49.7						
	07	162 04.2	331 18.1	45.5	288 46.9	17.1	125 28.4	02.2	188 42.5	49.6	Alkaid	152 53.2 N	49 11.6						
	08	177 06.6	346 17.9	46.4	303 47.5	17.5	140 31.2	02.1	203 44.9	49.6	Alnair	27 34.1 S	46 51.0						
	09	192 09.1	1 17.7	47.4	318 48.2	18.0	155 34.0	02.0	218 47.3	49.6	Alnilam	275 38.4 S	1 11.1						
	10	207 11.6	16 17.6	48.4	333 48.8	18.4	170 36.7	01.9	233 49.7	49.5	Alphard	217 48.7 S	8 45.5						
	11	222 14.0	31 17.4	49.4	348 49.5	18.8	185 39.5	01.8	248 52.1	49.5									
	12	237 16.5	46 17.2 S	2 50.4	3 50.1 S	19 19.3	200 42.3 N	13 01.7	263 54.5 S	12 49.5	Alphecca	126 04.9 N	26 38.1						
	13	252 19.0	61 17.0	51.4	18 50.8	19.7	215 45.0	01.6	278 57.0	49.4	Alpheratz	357 35.6 N	29 13.5						
	14	267 21.4	76 16.8	52.4	33 51.4	20.2	230 47.8	01.5	293 59.4	49.4	Altair	62 01.1 N	8 56.0						
	15	282 23.9	91 16.7	53.4	48 52.1	20.6	245 50.6	01.4	309 01.8	49.4	Ankaa	353 07.8 S	42 10.7						
	16	297 26.4	106 16.5	54.4	63 52.7	21.0	260 53.3	01.4	324 04.2	49.4	Antares	112 17.4 S	26 29.0						
	17	312 28.8	121 16.3	55.4	78 53.4	21.5	275 56.1	01.3	339 06.6	49.3									
	18	327 31.3	136 16.1 S	2 56.4	93 54.0 S	19 21.9	290 58.9 N	13 01.2	354 09.0 S	12 49.3	Arcturus	145 49.1 N	19 03.5						
	19	342 33.7	151 15.9	57.4	108 54.7	22.4	306 01.6	01.1	9 11.4	49.3	Atria	107 13.1 S	69 04.2						
	20	357 36.2	166 15.7	58.4	123 55.3	22.8	321 04.4	01.0	24 13.8	49.3	Avior	234 14.9 S	59 34.8						
	21	12 38.7	181 15.6	2 59.4	138 56.0	23.2	336 07.2	00.9	39 16.2	49.2	Bellatrix	278 23.6 N	6 22.3						
	22	27 41.1	196 15.4	3 00.4	153 56.6	23.7	351 09.9	00.8	54 18.6	49.2	Betelgeuse	270 52.8 N	7 24.8						
	23	42 43.6	211 15.2	01.4	168 57.3	24.1	6 12.7	00.7	69 21.0	49.2									
SUNDAY	1900	57 46.1	226 15.0 S	3 02.4	183 57.9 S	19 24.6	21 15.5 N	13 00.6	84 23.4 S	12 49.2	Canopus	263 52.4 S	52 42.2						
	01	72 48.5	241 14.8	03.4	198 58.6	25.0	36 18.2	00.5	99 25.8	49.1	Capella	280 22.9 N	46 01.3						
	02	87 51.0	256 14.6	04.4	213 59.2	25.4	51 21.0	00.4	114 28.2	49.1	Deneb	49 26.6 N	45 22.1						
	03	102 53.5	271 14.4	05.4	228 59.9	25.9	66 23.7	00.4	129 30.6	49.1	Denebola	182 26.1 N	14 26.4						
	04	117 55.9	286 14.3	06.4	244 00.5	26.3	81 26.5	00.3	144 33.0	49.0	Diphda	348 48.0 S	17 51.4						
	05	132 58.4	301 14.1	07.4	259 01.2	26.7	96 29.3	00.2	159 35.4	49.0									
	06	148 00.9	316 13.9 S	3 08.4	274 01.8 S	19 27.2	111 32.0 N	13 00.1	174 37.8 S	12 49.0	Dubhe	193 42.4 N	61 37.1						
	07	163 03.3	331 13.7	09.4	289 02.5	27.6	126 34.8	13 00.0	189 40.2	48.9	El Nath	278 02.7 N	28 37.7						
	08	178 05.8	346 13.5	10.4	304 03.1	28.1	141 37.6	12 59.9	204 42.6	48.9	Eltanin	90 43.1 N	51 29.3						
	09	193 08.2	1 13.3	11.4	319 03.8	28.5	156 40.3	59.8	219 45.1	48.9	Enif	33 39.8 N	9 59.1						
	10	208 10.7	16 13.1	12.4	334 04.4	28.9	171 43.1	59.7	234 47.5	48.9	Fomalhaut	15 15.5 S	29 29.9						
	11	223 13.2	31 12.9	13.4	349 05.0	29.4	186 45.9	59.6	249 49.9	48.8									
	12	238 15.6	46 12.8 S	3 14.4	4 05.7 S	19 29.8	201 48.6 N	12 59.5	264 52.3 S	12 48.8	Gacrux	171 53.1 S	57 14.5						
	13	253 18.1	61 12.6	15.4	19 06.3	30.2	216 51.4	59.5	279 54.7	48.8	Gienah	175 44.8 S	17 40.3						
	14	268 20.6	76 12.4	16.4	34 07.0	30.7	231 54.1	59.4	294 57.1	48.8	Hadar	148 38.0 S	60 29.1						
	15	283 23.0	91 12.2	17.4	49 07.6	31.1	246 56.9	59.3	309 59.5	48.7	Hamal	327 52.0 N	23 34.6						
	16	298 25.5	106 12.0	18.4	64 08.3	31.6	261 59.7	59.2	325 01.9	48.7	Kaus Aust.	83 34.1 S	34 22.5						
	17	313 28.0	121 11.8	19.4	79 08.9	32.0	277 02.4	59.1	340 04.3	48.7									
	18	328 30.4	136 11.6 S	3 20.4	94 09.6 S	19 32.4	292 05.2 N	12 59.0	355 06.7 S	12 48.7	Kochab	137 20.9 N	74 03.3						
	19	343 32.9	151 11.4	21.4	109 10.2	32.9	307 07.9	58.9	10 09.1	48.6	Markab	13 30.8 N	15 20.1						
	20	358 35.4	166 11.2	22.4	124 10.8	33.3	322 10.7	58.8	25 11.5	48.6	Menkar	314 06.8 N	4 11.1						
	21	13 37.8	181 11.0	23.4	139 11.5	33.7	337 13.5	58.7	40 13.9	48.6	Menkent	147 59.1 S	36 29.1						
	22	28 40.3	196 10.8	24.4	154 12.1	34.2	352 16.2	58.6	55 16.3	48.5	Miaplacidus	221 38.3 S	69 48.5						
	23	43 42.7	211 10.6	25.4	169 12.8	34.6	7 19.0	58.6	70 18.7	48.5									
MONDAY	2000	58 45.2	226 10.5 S	3 26.4	184 13.4 S	19 35.0	22 21.8 N	12 58.5	85 21.1 S	12 48.5	Mirfak	308 29.1 N	49 56.8						
	01	73 47.7	241 10.3	27.4	199 14.1	35.5	37 24.5	58.4	100 23.5	48.5	Nunki	75 49.2 S	26 16.1						
	02	88 50.1	256 10.1	28.4	214 14.7	35.9	52 27.3	58.3	115 25.9	48.4	Peacock	53 07.5 S	56 39.7						
	03	103 52.6	271 09.9	29.4	229 15.3	36.3	67 30.0	58.2	130 28.3	48.4	Pollux	243 18.3 N	27 58.1						
	04	118 55.1	286 09.7	30.4	244 16.0	36.8	82 32.8	58.1	145 30.7	48.4	Procyon	244 51.7 N	5 09.9						
	05	133 57.5	301 09.5	31.4	259 16.6	37.2	97 35.6	58.0	160 33.1	48.3									
	06	149 00.0	316 09.3 S	3 32.4	274 17.3 S	19 37.6	112 38.3 N	12 57.9	175 35.5 S	12 48.3	Rasalhague	95 59.8 N	12 32.6						
	07	164 02.5	331 09.1	33.4	289 17.9	38.0	127 41.1	57.8	190 37.9	48.3	Regulus	207 35.5 N	11 51.1						
	08	179 04.9	346 08.9	34.4	304 18.5	38.5	142 43.8	57.8	205 40.3	48.2	Rigel	281 04.5 S	8 10.3						
	09	194 07.4	1 08.7	35.4	319 19.2	38.9	157 46.6	57.7	220 42.7	48.2	Rigel Kent.	139 42.3 S	60 55.8						
	10	209 09.8	16 08.5	36.4	334 19.8	39.3	172 49.3	57.6	235 45.1	48.2	Sabik	102 04.2 S	15 45.2						
	11	224 12.3	31 08.3	37.4	349 20.5	39.8	187 52.1	57.5	250 47.5	48.2									
	12	239 14.8	46 08.1 S	3 38.4	4 21.1 S	19 40.2	202 54.9 N	12 57.4	265 49.9 S	12 48.1	Schedar	349 31.8 N	56 40.3						
	13	254 17.2	61 07.9	39.4	19 21.7	40.6	217 57.6	57.3	280 52.3	48.1	Shaula	96 12.1 S	37 07.3						
	14	269 19.7	76 07.7	40.4	34 22.4	41.1	233 00.4	57.2	295 54.7	48.1	Sirius	258 26.8 S	16 44.8						
	15	284 22.2	91 07.5	41.4	49 23.0	41.5	248 03.1	57.1	310 57.1	48.0	Spica	158 23.6 S	11 17.0						
	16	299 24.6	106 07.3	42.4	64 23.7	41.9	263 05.9	57.0	325 59.5	48.0	Suhail	222 46.9 S	43 31.4						
	17	314 27.1	121 07.1	43.4	79 24.3	42.3	278 08.7	57.0	341 01.9	48.0									
	18	329 29.6	136 06.9 S	3 44.4	94 24.9 S	19 42.8	293 11.4 N	12 56.9	356 04.3 S	12 48.0	Vega	80 34.2 N	38 48.5						
	19	344 32.0	151 06.7	45.4	109 25.6	43.2	308 14.2	56.8	11 06.7	47.9	Zuben'ubi	136 57.4 S	16 08.3						
	20	359 34.5	166 06.5	46.4	124 26.2	43.6	323 16.9	56.7	26 09.1	47.9									
	21	14 37.0	181 06.3	47.4	139 26.9	44.0	338 19.7	56.6	41 11.5	47.9									
	22	29 39.4	196 06.1	48.4	154 27.5	44.5	353 22.4	56.5	56 13.9	47.8	Venus	168 28.9	h 8 55						
	23	44 41.9	211 05.9	49.4	169 28.1	44.9	8 25.2	56.4	71 16.2	47.8	Mars	126 11.9	h 11 44						

UT	SUN			MOON							Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec		GHA	v	Dec	d	HP	Naut.	Civil		18	19		20	21		
d h	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	h m	h m	h m	h m	h m	h m	h m	h m		
1800	183 44.9	S19 06.3	120 38.8	5.1	S26 33.1	6.2	58.7	N 72	07 12	08 52	■	■	■	16 07	15 08			
	198 44.8	06.9	135 02.9	5.2	26 26.9	6.3	58.7	N 70	07 01	08 26	10 16	■	■	15 35	14 54			
	213 44.7	07.5	149 27.1	5.3	26 20.6	6.5	58.7	68	06 51	08 06	09 31	■	16 02	15 11	14 43			
	228 44.5	08.1	163 51.4	5.3	26 14.1	6.7	58.8	66	06 43	07 50	09 01	■	15 20	14 52	14 34			
	243 44.4	08.7	178 15.7	5.4	26 07.4	6.8	58.8	64	06 36	07 37	08 39	15 20	14 51	14 37	14 26			
SATURDAY	258 44.3	09.3	192 40.1	5.4	26 00.6	7.0	58.8	62	06 30	07 26	08 22	14 36	14 29	14 24	14 19			
	273 44.2	S19 09.9	207 04.5	5.5	S25 53.6	7.2	58.8	60	06 24	07 17	08 07	14 06	14 11	14 13	14 13			
	288 44.0	10.5	221 29.0	5.6	25 46.4	7.3	58.8	N 58	06 19	07 08	07 55	13 44	13 56	14 03	14 08			
	303 43.9	11.1	235 53.6	5.6	25 39.1	7.5	58.8	56	06 15	07 01	07 44	13 25	13 43	13 55	14 03			
	318 43.8	11.7	250 18.2	5.8	25 31.6	7.7	58.8	54	06 10	06 54	07 35	13 09	13 32	13 47	13 59			
	333 43.6	12.3	264 43.0	5.7	25 23.9	7.8	58.8	52	06 07	06 48	07 26	12 56	13 22	13 40	13 55			
	348 43.5	12.9	279 07.7	5.9	25 16.1	8.0	58.8	50	06 03	06 43	07 19	12 44	13 13	13 34	13 51			
	3 43.4	S19 13.5	293 32.6	5.9	S25 08.1	8.1	58.9	45	05 55	06 30	07 02	12 19	12 54	13 21	13 44			
	18 43.2	14.1	307 57.5	6.0	25 00.0	8.3	58.9	N 40	05 47	06 20	06 49	11 59	12 38	13 10	13 37			
	33 43.1	14.7	322 22.5	6.1	24 51.7	8.5	58.9	35	05 40	06 11	06 38	11 43	12 25	13 01	13 32			
	48 43.0	15.3	336 47.6	6.1	24 43.2	8.6	58.9	30	05 34	06 03	06 28	11 28	12 13	12 52	13 27			
	63 42.8	15.9	351 12.7	6.2	24 34.6	8.8	58.9	20	05 21	05 48	06 11	11 04	11 53	12 38	13 18			
	78 42.7	16.5	5 37.9	6.3	24 25.8	8.9	58.9	N 10	05 08	05 34	05 56	10 43	11 36	12 25	13 11			
	93 42.6	S19 17.1	20 03.2	6.4	S24 16.9	9.1	58.9	0	04 54	05 20	05 42	10 23	11 20	12 13	13 03			
	108 42.4	17.7	34 28.6	6.5	24 07.8	9.2	58.9	S 10	04 39	05 05	05 27	10 03	11 03	12 01	12 56			
	123 42.3	18.3	48 54.1	6.5	23 58.6	9.4	58.9	20	04 20	04 48	05 12	09 41	10 46	11 48	12 49			
	138 42.2	18.9	63 19.6	6.6	23 49.2	9.6	58.9	30	03 56	04 28	04 54	09 16	10 25	11 33	12 40			
	153 42.0	19.4	77 45.2	6.7	23 39.6	9.7	59.0	35	03 41	04 16	04 44	09 02	10 13	11 25	12 35			
	168 41.9	20.0	92 10.9	6.8	23 29.9	9.8	59.0	40	03 23	04 01	04 32	08 44	09 59	11 15	12 29			
	1900	183 41.8	S19 20.6	106 36.7	6.9	S23 20.1	10.0	59.0	45	02 59	03 43	04 17	08 24	09 43	11 03	12 22		
		198 41.6	21.2	121 02.6	6.9	23 10.1	10.1	59.0	S 50	02 27	03 20	04 00	07 58	09 23	10 49	12 14		
		213 41.5	21.8	135 28.5	7.0	23 00.0	10.2	59.0	52	02 10	03 09	03 52	07 45	09 13	10 42	12 10		
		228 41.4	22.4	149 54.5	7.1	22 49.8	10.4	59.0	54	01 49	02 56	03 42	07 31	09 02	10 35	12 06		
		243 41.2	23.0	164 20.6	7.2	22 39.4	10.6	59.0	56	01 20	02 41	03 32	07 14	08 50	10 27	12 01		
		258 41.1	23.6	178 46.8	7.3	22 28.8	10.6	59.0	58	00 34	02 23	03 20	06 53	08 35	10 17	11 56		
273 41.0		S19 24.1	193 13.1	7.4	S22 18.2	10.9	59.0	S 60	////	02 01	03 06	06 27	08 18	10 06	11 50			
288 40.8		24.7	207 39.5	7.4	22 07.3	10.9	59.0	Lat.	Sunset	Twilight		Moonset						
303 40.7		25.3	222 05.9	7.5	21 56.4	11.1	59.0	Civil	Naut.	18	19	20	21					
318 40.5		25.9	236 32.4	7.7	21 45.3	11.2	59.0	°	h m	h m	h m	h m	h m	h m	h m			
333 40.4		26.5	250 59.1	7.6	21 34.1	11.3	59.1	N 72	■	14 38	16 17	■	■	21 11	23 56			
348 40.3		27.1	265 25.7	7.8	21 22.8	11.5	59.1	N 70	13 14	15 04	16 29	■	■	21 42	24 07			
3 40.1		S19 27.6	279 52.5	7.9	S21 11.3	11.6	59.1	68	13 59	15 24	16 38	■	19 23	22 04	24 15			
18 40.0		28.2	294 19.4	8.0	20 59.7	11.7	59.1	66	14 29	15 39	16 47	■	20 03	22 21	24 22			
33 39.9		28.8	308 46.4	8.0	20 48.0	11.9	59.1	64	14 51	15 52	16 54	18 06	20 31	22 35	24 28			
48 39.7		29.4	323 13.4	8.1	20 36.1	11.9	59.1	62	15 08	16 04	17 00	18 49	20 52	22 46	24 34			
63 39.6		30.0	337 40.5	8.2	20 24.2	12.1	59.1	60	15 23	16 13	17 06	19 18	21 09	22 56	24 38			
78 39.4		30.5	352 07.7	8.3	20 12.1	12.2	59.1	N 58	15 35	16 22	17 11	19 40	21 23	23 04	24 42			
93 39.3		S19 31.1	6 35.0	8.4	S19 59.9	12.4	59.1	56	15 46	16 29	17 15	19 58	21 35	23 12	24 48			
108 39.1		31.7	21 02.4	8.4	19 47.5	12.4	59.1	54	15 56	16 36	17 20	20 13	21 46	23 18	24 45			
123 39.0		32.3	35 29.8	8.6	19 35.1	12.6	59.1	52	16 04	16 42	17 23	20 26	21 55	23 24	24 51			
138 38.9		32.8	49 57.4	8.7	19 22.5	12.6	59.1	50	16 12	16 48	17 27	20 37	22 04	23 30	24 54			
153 38.7		33.4	64 25.0	8.7	19 09.9	12.8	59.1	45	16 28	17 00	17 36	21 01	22 21	23 41	24 59			
168 38.6		34.0	78 52.7	8.8	18 57.1	12.9	59.1	N 40	16 41	17 10	17 43	21 20	22 35	23 50	25 04			
2000		183 38.4	S19 34.6	93 20.5	8.9	S18 44.2	13.0	59.2	35	16 52	17 19	17 50	21 36	22 47	23 58	25 07		
	198 38.3	35.1	107 48.4	8.9	18 31.2	13.1	59.2	30	17 02	17 28	17 57	21 49	22 58	24 05	00 05			
	213 38.1	35.7	122 16.3	9.1	18 18.1	13.2	59.2	20	17 20	17 43	18 10	22 12	23 16	24 17	00 17			
	228 38.0	36.3	136 44.4	9.1	18 04.9	13.3	59.2	N 10	17 35	17 57	18 23	22 32	23 31	24 28	00 28			
	243 37.9	36.9	151 12.5	9.2	17 51.6	13.5	59.2	0	17 49	18 11	18 36	22 50	23 45	24 37	00 37			
	258 37.7	37.4	165 40.7	9.3	17 38.1	13.5	59.2	S 10	18 03	18 26	18 52	23 09	24 00	00 00	00 47			
	273 37.6	S19 38.0	180 09.0	9.3	S17 24.6	13.6	59.2	20	18 19	18 43	19 11	23 28	24 15	00 15	00 57			
	288 37.4	38.6	194 37.3	9.4	17 11.0	13.7	59.2	30	18 37	19 03	19 35	23 50	24 32	00 32	01 08			
	303 37.3	39.1	209 05.7	9.6	16 57.3	13.8	59.2	35	18 47	19 16	19 50	24 03	00 03	00 42	01 15			
	318 37.1	39.7	223 34.3	9.5	16 43.5	13.9	59.2	40	18 59	19 30	20 09	24 18	00 18	00 53	01 22			
	333 37.0	40.3	238 02.8	9.7	16 29.6	14.0	59.2	45	19 14	19 48	20 33	24 36	00 36	01 06	01 31			
	348 36.8	40.8	252 31.5	9.7	16 15.6	14.1	59.2	S 50	19 32	20 12	21 06	00 23	00 57	01 22	01 41			
	3 36.7	S19 41.4	267 00.2	9.8	S16 01.5	14.2	59.2	52	19 40	20 23	21 23	00 36	01 08	01 30	01 46			
	18 36.5	42.0	281 29.0	9.9	15 47.3	14.3	59.2	54	19 49	20 36	21 45	00 51	01 19	01 38	01 51			
	33 36.4	42.5	295 57.9	10.0	15 33.0	14.4	59.2	56	20 00	20 51	22 14	01 08	01 32	01 47	01 57			
	48 36.2	43.1	310 26.9	10.0	15 18.6	14.4	59.2	58	20 12	21 10	23 06	01 29	01 47	01 57	02 03			
	63 36.1	43.7	324 55.9	10.1	15 04.2	14.5	59.2	S 60	20 26	21 33	////	01 56	02 06	02 09	02 10			
	78 35.9	44.2	339 25.0	10.2	14 49.7	14.6	59.2	Day	SUN			MOON						
	93 35.8	S19 44.8	353 54.2	10.2	S14 35.1	14.7	59.2		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase				
	108 35.6	45.4	8 23.4	10.3	14 20.4	14.8	59.2		00 ^h	12 ^h	Pass.	Upper			Lower			
	123 35.5	45.9	22 52.7	10.4	14 05.6	14.8	59.2		m s	m s	h m	h m	d %					
	138 35.3	46.5	37 22.1	10.4	13 50.8	15.0	59.3		15 00	14 54	11 45	16 37	04 07	05 29				
	MONDAY	153 35.2	47.1	51 51.5	10.6	13 35.8	14.9	59.3	14 47	14 41	11 45	17 33	05 05	06 39				
		168 35.0	47.6	66 21.1	10.5	S13 20.9	15.1	59.3	14 34	14 27	11 46	18 25	05 59	07 51				
		SD	16.2	d 0.6	SD	16.0	16.1	16.1										

UT		ARIES		VENUS −4.2		MARS +1.4		JUPITER −2.9		SATURN +0.8		STARS						
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec			
TUESDAY	d h	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /		° /	° /			
	21 00	59 44.3	226 05.7	S 3	50.4	184 28.8	S19	45.3	23 28.0	N12	56.3	86 18.6	S12	47.8	Acamar	315 12.1	S40	12.6
	01	74 46.8	241 05.5		51.4	199 29.4		45.8	38 30.7		56.3	101 21.0		47.7	Achernar	335 20.4	S57	07.1
	02	89 49.3	256 05.3		52.4	214 30.0		46.2	53 33.5		56.2	116 23.4		47.7	Acrux	173 01.6	S63	13.6
	03	104 51.7	271 05.1	. .	53.4	229 30.7	. .	46.6	68 36.2	. .	56.1	131 25.8	. .	47.7	Adhara	255 06.3	S29	00.0
	04	119 54.2	286 04.9		54.5	244 31.3		47.0	83 39.0		56.0	146 28.2		47.7	Aldebaran	290 40.4	N16	33.5
	05	134 56.7	301 04.7		55.5	259 31.9		47.5	98 41.7		55.9	161 30.6		47.6				
	06	149 59.1	316 04.5	S 3	56.5	274 32.6	S19	47.9	113 44.5	N12	55.8	176 33.0	S12	47.6	Alioth	166 14.2	N55	49.7
	07	165 01.6	331 04.3		57.5	289 33.2		48.3	128 47.2		55.7	191 35.4		47.6	Alkaid	152 53.2	N49	11.6
	08	180 04.1	346 04.1		58.5	304 33.8		48.7	143 50.0		55.6	206 37.8		47.5	Alnair	27 34.1	S46	51.0
	09	195 06.5	1 03.9	S 3	59.5	319 34.5	. .	49.1	158 52.7	. .	55.6	221 40.2	. .	47.5	Alnilam	275 38.4	S 1	11.1
	10	210 09.0	16 03.7	S 4	00.5	334 35.1		49.6	173 55.5		55.5	236 42.6		47.5	Alphard	217 48.6	S 8	45.6
	11	225 11.5	31 03.5		01.5	349 35.7		50.0	188 58.3		55.4	251 45.0		47.4				
	12	240 13.9	46 03.3	S 4	02.5	4 36.4	S19	50.4	204 01.0	N12	55.3	266 47.4	S12	47.4	Alphecca	126 04.9	N26	38.1
	13	255 16.4	61 03.0		03.5	19 37.0		50.8	219 03.8		55.2	281 49.8		47.4	Alpheratz	357 35.6	N29	13.5
	14	270 18.8	76 02.8		04.5	34 37.7		51.3	234 06.5		55.1	296 52.2		47.3	Altair	62 01.1	N 8	55.9
	15	285 21.3	91 02.6	. .	05.5	49 38.3	. .	51.7	249 09.3	. .	55.0	311 54.6	. .	47.3	Ankaa	353 07.8	S42	10.7
	16	300 23.8	106 02.4		06.5	64 38.9		52.1	264 12.0		54.9	326 57.0		47.3	Antares	112 17.4	S26	29.0
	17	315 26.2	121 02.2		07.5	79 39.5		52.5	279 14.8		54.9	341 59.4		47.2				
	18	330 28.7	136 02.0	S 4	08.5	94 40.2	S19	52.9	294 17.5	N12	54.8	357 01.8	S12	47.2	Arcturus	145 49.1	N19	03.5
	19	345 31.2	151 01.8		09.5	109 40.8		53.4	309 20.3		54.7	12 04.2		47.2	Atria	107 13.1	S69	04.2
	20	0 33.6	166 01.6		10.5	124 41.4		53.8	324 23.0		54.6	27 06.5		47.2	Avior	234 14.8	S59	34.8
	21	15 36.1	181 01.4	. .	11.5	139 42.1	. .	54.2	339 25.8	. .	54.5	42 08.9	. .	47.1	Bellatrix	278 23.6	N 6	22.3
	22	30 38.6	196 01.2		12.6	154 42.7		54.6	354 28.5		54.4	57 11.3		47.1	Betelgeuse	270 52.8	N 7	24.8
	23	45 41.0	211 01.0		13.6	169 43.3		55.0	9 31.3		54.3	72 13.7		47.1				
WEDNESDAY	22 00	60 43.5	226 00.7	S 4	14.6	184 44.0	S19	55.5	24 34.0	N12	54.3	87 16.1	S12	47.0	Canopus	263 52.4	S52	42.2
	01	75 45.9	241 00.5		15.6	199 44.6		55.9	39 36.8		54.2	102 18.5		47.0	Capella	280 22.9	N46	01.3
	02	90 48.4	256 00.3		16.6	214 45.2		56.3	54 39.5		54.1	117 20.9		47.0	Deneb	49 26.6	N45	22.1
	03	105 50.9	271 00.1	. .	17.6	229 45.9	. .	56.7	69 42.3	. .	54.0	132 23.3	. .	46.9	Denebola	182 26.1	N14	26.4
	04	120 53.3	285 59.9		18.6	244 46.5		57.1	84 45.0		53.9	147 25.7		46.9	Diphda	348 48.0	S17	51.4
	05	135 55.8	300 59.7		19.6	259 47.1		57.6	99 47.8		53.8	162 28.1		46.9				
	06	150 58.3	315 59.5	S 4	20.6	274 47.7	S19	58.0	114 50.5	N12	53.7	177 30.5	S12	46.8	Dubhe	193 42.3	N61	37.1
	07	166 00.7	330 59.3		21.6	289 48.4		58.4	129 53.3		53.7	192 32.9		46.8	Elnath	278 02.7	N28	37.7
	08	181 03.2	345 59.1		22.6	304 49.0		58.8	144 56.0		53.6	207 35.2		46.8	Eltanin	90 43.1	N51	29.2
	09	196 05.7	0 58.8	. .	23.6	319 49.6	. .	59.2	159 58.8	. .	53.5	222 37.6	. .	46.7	Enif	33 39.8	N 9	59.1
	10	211 08.1	15 58.6		24.6	334 50.3	S19	59.6	175 01.5		53.4	237 40.0		46.7	Fomalhaut	15 15.5	S29	29.9
	11	226 10.6	30 58.4		25.7	349 50.9	S20	00.1	190 04.3		53.3	252 42.4		46.7				
	12	241 13.1	45 58.2	S 4	26.7	4 51.5	S20	00.5	205 07.0	N12	53.2	267 44.8	S12	46.6	Gacrux	171 53.1	S57	14.5
	13	256 15.5	60 58.0		27.7	19 52.1		00.9	220 09.8		53.1	282 47.2		46.6	Gienah	175 44.8	S17	40.3
	14	271 18.0	75 57.8		28.7	34 52.8		01.3	235 12.5		53.1	297 49.6		46.6	Hadar	148 38.0	S60	29.1
	15	286 20.4	90 57.5	. .	29.7	49 53.4	. .	01.7	250 15.3	. .	53.0	312 52.0	. .	46.5	Hamal	327 52.0	N23	34.6
	16	301 22.9	105 57.3		30.7	64 54.0		02.1	265 18.0		52.9	327 54.4		46.5	Kaus Aust.	83 34.1	S34	22.5
	17	316 25.4	120 57.1		31.7	79 54.7		02.5	280 20.8		52.8	342 56.8		46.5				
	18	331 27.8	135 56.9	S 4	32.7	94 55.3	S20	03.0	295 23.5	N12	52.7	357 59.2	S12	46.4	Kochab	137 20.9	N74	03.3
	19	346 30.3	150 56.7		33.7	109 55.9		03.4	310 26.3		52.6	13 01.5		46.4	Markab	13 30.8	N15	20.1
	20	1 32.8	165 56.5		34.7	124 56.5		03.8	325 29.0		52.5	28 03.9		46.4	Menkar	314 06.8	N 4	11.1
	21	16 35.2	180 56.2	. .	35.7	139 57.2	. .	04.2	340 31.8	. .	52.5	43 06.3	. .	46.3	Menkent	147 59.1	S36	29.1
	22	31 37.7	195 56.0		36.7	154 57.8		04.6	355 34.5		52.4	58 08.7		46.3	Miaplacidus	221 38.3	S69	48.5
	23	46 40.2	210 55.8		37.8	169 58.4		05.0	10 37.3		52.3	73 11.1		46.3				
	THURSDAY	23 00	61 42.6	225 55.6	S 4	38.8	184 59.0	S20	05.4	25 40.0	N12	52.2	88 13.5	S12	46.2	Mirfak	308 29.1	N49
01		76 45.1	240 55.4		39.8	199 59.7		05.8	40 42.8		52.1	103 15.9		46.2	Nunki	75 49.2	S26	16.1
02		91 47.6	255 55.1		40.8	215 00.3		06.3	55 45.5		52.0	118 18.3		46.2	Peacock	53 07.5	S56	39.7
03		106 50.0	270 54.9	. .	41.8	230 00.9	. .	06.7	70 48.3	. .	52.0	133 20.7	. .	46.1	Pollux	243 18.3	N27	58.1
04		121 52.5	285 54.7		42.8	245 01.5		07.1	85 51.0		51.9	148 23.0		46.1	Procyon	244 51.6	N 5	09.9
05		136 54.9	300 54.5		43.8	260 02.2		07.5	100 53.8		51.8	163 25.4		46.1				
06		151 57.4	315 54.3	S 4	44.8	275 02.8	S20	07.9	115 56.5	N12	51.7	178 27.8	S12	46.0	Rasalhague	95 59.8	N12	32.6
07		166 59.9	330 54.0		45.8	290 03.4		08.3	130 59.2		51.6	193 30.2		46.0	Regulus	207 35.5	N11	51.1
08		182 02.3	345 53.8		46.8	305 04.0		08.7	146 02.0		51.5	208 32.6		46.0	Rigel	281 04.5	S 8	10.3
09		197 04.8	0 53.6	. .	47.8	320 04.6	. .	09.1	161 04.7	. .	51.5	223 35.0	. .	45.9	Rigel Kent.	139 42.3	S60	55.8
10		212 07.3	15 53.4		48.9	335 05.3		09.5	176 07.5		51.4	238 37.4		45.9	Sabik	102 04.2	S15	45.2
11		227 09.7	30 53.1		49.9	350 05.9		09.9	191 10.2		51.3	253 39.8		45.9				
12		242 12.2	45 52.9	S 4	50.9	5 06.5	S20	10.4	206 13.0	N12	51.2	268 42.1	S12	45.8	Schedar	349 31.8	N56	40.3
13		257 14.7	60 52.7		51.9	20 07.1		10.8	221 15.7		51.1	283 44.5		45.8	Shaula	96 12.1	S37	07.3
14		272 17.1	75 52.5		52.9	35 07.8		11.2	236 18.5		51.0	298 46.9		45.8	Sirius	258 26.8	S16	44.8
15		287 19.6	90 52.3	. .	53.9	50 08.4	. .	11.6	251 21.2	. .	50.9	313 49.3	. .	45.7	Spica	158 23.6	S11	17.0
16		302 22.0	105 52.0		54.9	65 09.0		12.0	266 23.9		50.9	328 51.7		45.7	Suhail	222 46.9	S43	31.4
17		317 24.5	120 51.8		55.9	80 09.6		12.4	281 26.7		50.8	343 54.1		45.7				
18		332 27.0	135 51.6	S 4	56.9	95 10.2	S20	12.8	296 29.4	N12	50.7	358 56.5	S12	45.6	Vega	80 34.2	N38	48.5
19		347 29.4	150 51.3		57.9	110 10.9		13.2	311 32.2		50.6	13 58.8		45.6	Zuben'ubi	136 57.4	S16	08.3
20		2 31.9	165 51.1	S 4	59.0	125 11.5		13.6	326 34.9		50.5	29 01.2		45.6				
21		17 34.4	180 50.9	S 5	00.0	140 12.1	. .	14.0	341 37.7	. .	50.4	44 03.6	. .	45.5		SHA	Mer.Pass	
22		32 36.8	19															

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise																	
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	21	22	23	24													
	h	m		h	m																									
TUESDAY	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m												
	21	00	183	34.9	S19	48.2	80	50.6	10.7	S13	05.8	15.2	59.3	N	70	07	10	08	37	10	42	14	54	14	25	13	57	13	27	
	01	198	34.7		48.7	95	20.3	10.7	12	50.6	15.2	59.3	68	06	59	08	16	09	46	14	43	14	22	14	01	13	40			
	02	213	34.6		49.3	109	50.0	10.7	12	35.4	15.2	59.3	66	06	50	07	59	09	13	14	34	14	19	14	05	13	50			
	03	228	34.4		49.8	124	19.7	10.8	12	20.2	15.4	59.3	64	06	43	07	45	08	49	14	26	14	17	14	08	13	58			
	04	243	34.3			138	49.5	10.9	12	04.8	15.4	59.3	62	06	36	07	33	08	30	14	19	14	14	14	10	14	06			
	05	258	34.1		51.0	153	19.4	10.9	11	49.4	15.5	59.3	60	06	30	07	23	08	14	14	13	14	13	14	12	14	12			
	06	273	34.0	S19	51.5	167	49.3	11.0	S11	33.9	15.5	59.3	N	58	06	25	07	14	08	01	14	08	14	11	14	14	14	18		
	07	288	33.8		52.1	182	19.3	11.1	11	18.4	15.6	59.3	56	06	20	07	06	07	50	14	03	14	10	14	16	14	23			
	08	303	33.7		52.6	196	49.4	11.1	11	02.8	15.6	59.3	54	06	15	06	59	07	40	13	59	14	08	14	18	14	27			
	09	318	33.5		53.2	211	19.5	11.1	10	47.2	15.8	59.3	52	06	11	06	53	07	31	13	55	14	07	14	19	14	32			
	10	333	33.4		53.7	225	49.6	11.2	10	31.4	15.7	59.3	50	06	07	06	47	07	23	13	51	14	06	14	20	14	35			
	11	348	33.2		54.3	240	19.8	11.3	10	15.7	15.8	59.3	45	05	58	06	34	07	06	13	44	14	04	14	23	14	44			
	12	3	33.0	S19	54.8	254	50.1	11.3	S	9	59.9	15.9	59.3	N	40	05	50	06	23	06	53	13	37	14	02	14	26	14	51	
	13	18	32.9		55.4	269	20.4	11.3	9	44.0	15.9	59.3	35	05	43	06	14	06	41	13	32	14	00	14	28	14	57			
	14	33	32.7		55.9	283	50.7	11.4	9	28.1	16.0	59.3	30	05	36	06	05	06	31	13	27	13	59	14	30	15	02			
	15	48	32.6		56.5	298	21.1	11.5	9	12.1	16.0	59.3	20	05	22	05	49	06	13	13	18	13	56	14	33	15	11			
	16	63	32.4		57.0	312	51.6	11.5	8	56.1	16.1	59.3	N	10	05	09	05	35	05	57	13	11	13	54	14	36	15	20		
	17	78	32.3		57.6	327	22.1	11.5	8	40.0	16.1	59.3	0	04	55	05	20	05	42	13	03	13	52	14	39	15	27			
	18	93	32.1	S19	58.1	341	52.6	11.6	S	8	23.9	16.2	59.3	S	10	04	39	05	05	28	12	56	13	49	14	42	15	35		
	19	108	31.9		58.7	356	23.2	11.6	8	07.7	16.2	59.3	20	04	19	04	48	05	12	12	49	13	47	14	45	15	44			
	20	123	31.8		59.2	10	53.8	11.7	7	51.5	16.2	59.3	30	03	55	04	27	04	53	12	40	13	45	14	49	15	54			
	21	138	31.6	19	59.8	25	24.5	11.7	7	35.3	16.3	59.3	35	03	39	04	14	04	42	12	35	13	43	14	51	15	59			
	22	153	31.5	20	00.3	39	55.2	11.7	7	19.0	16.3	59.3	40	03	20	03	59	04	30	12	29	13	41	14	53	16	06			
	23	168	31.3		00.9	54	25.9	11.8	7	02.7	16.4	59.3	45	02	55	03	40	04	15	12	22	13	39	14	56	16	13			
WEDNESDAY	22	00	183	31.2	S20	01.4	68	56.7	11.8	S	6	46.3	16.3	59.3	S	50	02	21	03	16	03	57	12	14	13	37	15	00	16	23
	01	198	31.0		01.9	83	27.5	11.8	6	30.0	16.5	59.3	52	02	03	03	04	03	48	12	10	13	36	15	01	16	27			
	02	213	30.8		02.5	97	58.3	11.9	6	13.5	16.4	59.3	54	01	40	02	51	03	38	12	06	13	35	15	03	16	32			
	03	228	30.7		03.0	112	29.2	11.9	5	57.1	16.5	59.3	56	01	08	02	35	03	27	12	01	13	34	15	05	16	37			
	04	243	30.5		03.6	127	00.1	11.9	5	40.6	16.5	59.3	58	////	02	16	03	15	11	56	13	32	15	07	16	43				
	05	258	30.4		04.1	141	31.0	12.0	5	24.1	16.6	59.3	S	60	////	01	51	03	00	11	50	13	30	15	09	16	50			
	06	273	30.2	S20	04.7	156	02.0	11.9	S	5	07.5	16.5	59.3																	
	07	288	30.0		05.2	170	32.9	12.1	4	51.0	16.6	59.3	Lat.	Sunset	Twilight		Moonset													
	08	303	29.9		05.7	185	04.0	12.0	4	34.4	16.6	59.3			Civil	Naut.	21	22	23	24										
	09	318	29.7		06.3	199	35.0	12.1	4	17.8	16.7	59.3																		
	10	333	29.5		06.8	214	06.1	12.0	4	01.1	16.6	59.3																		
	11	348	29.4		07.3	228	37.1	12.1	3	44.5	16.7	59.3	N	72	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m
	12	3	29.2	S20	07.9	243	08.2	12.2	S	3	27.8	16.7	59.3	N	70	12	49	14	54	16	21	24	07	00	07	02	19	04	31	
	13	18	29.0		08.4	257	39.4	12.1	3	11.1	16.7	59.3	68	13	46	15	15	16	32	24	15	00	15	02	19	04	22			
	14	33	28.9		09.0	272	10.5	12.1	2	54.4	16.7	59.3	66	14	19	15	32	16	41	24	22	00	22	02	18	04	14			
	15	48	28.7		09.5	286	41.6	12.2	2	37.7	16.7	59.3	64	14	43	15	46	16	49	24	28	00	28	02	18	04	07			
	16	63	28.6		10.0	301	12.8	12.2	2	21.0	16.7	59.3	62	15	02	15	58	16	55	24	34	00	34	02	18	04	01			
	17	78	28.4		10.6	315	44.0	12.2	2	04.3	16.8	59.3	60	15	17	16	08	17	01	24	38	00	38	02	17	03	57			
	18	93	28.2	S20	11.1	330	15.2	12.2	S	1	47.5	16.8	59.3	N	58	15	30	16	17	17	07	24	42	00	42	02	17	03	52	
	19	108	28.1		11.6	344	46.4	12.2	1	30.7	16.7	59.3	56	15	42	16	25	17	12	24	45	00	45	02	17	03	48			
	20	123	27.9		12.2	359	17.6	12.2	1	14.0	16.8	59.2	54	15	52	16	32	17	16	24	48	00	48	02	17	03	45			
	21	138	27.7		12.7	13	48.8	12.3	0	57.2	16.8	59.2	52	16	00	16	39	17	21	24	51	00	51	02	17	03	42			
	22	153	27.6		13.2	28	20.1	12.2	0	40.4	16.7	59.2	50	16	08	16	45	17	25	24	54	00	54	02	16	03	39			
	23	168	27.4		13.7	42	51.3	12.2	0	23.7	16.8	59.2	45	16	25	16	58	17	34	24	59	00	59	02	16	03	33			
	THURSDAY	23	00	183	27.2	S20	14.3	57	22.5	12.3	S	0	06.9	16.8	59.2	N	40	16	39	17	09	17	42	25	04	01	04	02	16	03
01		198	27.1		14.8	71	53.8	12.2	N	0	09.9	16.8	59.2	35	16	51	17	18	17	49	25	07	01	07	02	16	03	24		
02		213	26.9		15.3	86	25.0	12.3	0	26.7	16.7	59.2	30	17	01	17	27	17	56	00	05	01	11	02	15	03	20			
03		228	26.7		15.9	100	56.3	12.2	0	43.4	16.8	59.2	20	17	19	17	43	18	10	00	17	01	17	02	15	03	13			
04		243	26.5		16.4	115	27.5	12.3	1	00.2	16.7	59.2	N	10	17	35	17	57	18	23	00	28	01	22	02	15	03	07		
05		258	26.4		16.9	129	58.8	12.2	1	16.9	16.8	59.2	0	17	50	18	12	18	37	00	37	01	26	02	14	03	02			
06		273	26.2	S20	17.4	144	30.0	12.2	N	1	33.7	16.7	59.2	S	10	18	05	18	27	18	54	00	47	0						

UT		ARIES		VENUS -4.2		MARS +1.4		JUPITER -2.8		SATURN +0.8		STARS			
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
d h		° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "		° / ' / "	° / ' / "
24	00	62 41.8	225 50.2	S 5 03.0	185 14.0	S20 15.2	26 45.9	N12 50.2	89 10.8	S12 45.4	Acamar	315 12.1	S40 12.6		
	01	77 44.2	240 50.0	04.0	200 14.6	15.6	41 48.6	50.1	104 13.1	45.4	Achernar	335 20.4	S57 07.1		
	02	92 46.7	255 49.8	05.0	215 15.2	16.0	56 51.4	50.0	119 15.5	45.4	Acrux	173 01.6	S63 13.6		
	03	107 49.2	270 49.5	06.0	230 15.8	16.4	71 54.1	50.0	134 17.9	45.3	Adhara	255 06.3	S29 00.1		
04	122 51.6	285 49.3	07.0	245 16.4	16.8	86 56.8	49.9	149 20.3	45.3	Aldebaran	290 40.4	N16 33.5			
05	137 54.1	300 49.1	08.1	260 17.0	17.3	101 59.6	49.8	164 22.7	45.3						
06	152 56.5	315 48.8	S 5 09.1	275 17.7	S20 17.7	117 02.3	N12 49.7	179 25.1	S12 45.2	Alioth	166 14.2	N55 49.7			
07	167 59.0	330 48.6	10.1	290 18.3	18.1	132 05.1	49.6	194 27.5	45.2	Alkaid	152 53.2	N49 11.5			
08	183 01.5	345 48.4	11.1	305 18.9	18.5	147 07.8	49.5	209 29.8	45.2	Alnair	27 34.1	S46 51.0			
FRI	09	198 03.9	0 48.1	12.1	320 19.5	18.9	162 10.5	49.5	224 32.2	45.1	Alnilam	275 38.4	S 1 11.1		
	10	213 06.4	15 47.9	13.1	335 20.1	19.3	177 13.3	49.4	239 34.6	45.1	Alphard	217 48.6	S 8 45.6		
	11	228 08.9	30 47.7	14.1	350 20.7	19.7	192 16.0	49.3	254 37.0	45.0					
	12	243 11.3	45 47.4	S 5 15.1	5 21.4	S20 20.1	207 18.8	N12 49.2	269 39.4	S12 45.0	Alphecca	126 04.9	N26 38.1		
13	258 13.8	60 47.2	16.1	20 22.0	20.5	222 21.5	49.1	284 41.7	45.0	Alpheratz	357 35.6	N29 13.5			
14	273 16.3	75 47.0	17.2	35 22.6	20.9	237 24.2	49.0	299 44.1	44.9	Altair	62 01.1	N 8 55.9			
15	288 18.7	90 46.7	18.2	50 23.2	21.3	252 27.0	49.0	314 46.5	44.9	Ankaa	353 07.8	S42 10.8			
16	303 21.2	105 46.5	19.2	65 23.8	21.7	267 29.7	48.9	329 48.9	44.9	Antares	112 17.4	S26 29.0			
17	318 23.7	120 46.3	20.2	80 24.4	22.1	282 32.5	48.8	344 51.3	44.8						
18	333 26.1	135 46.0	S 5 21.2	95 25.1	S20 22.5	297 35.2	N12 48.7	359 53.7	S12 44.8	Arcturus	145 49.1	N19 03.5			
19	348 28.6	150 45.8	22.2	110 25.7	22.9	312 37.9	48.6	14 56.0	44.8	Atria	107 13.1	S69 04.2			
20	3 31.0	165 45.6	23.2	125 26.3	23.3	327 40.7	48.6	29 58.4	44.7	Avior	234 14.8	S59 34.8			
21	18 33.5	180 45.3	24.2	140 26.9	23.7	342 43.4	48.5	45 00.8	44.7	Bellatrix	278 23.6	N 6 22.3			
22	33 36.0	195 45.1	25.2	155 27.5	24.1	357 46.1	48.4	60 03.2	44.7	Betelgeuse	270 52.8	N 7 24.8			
23	48 38.4	210 44.9	26.3	170 28.1	24.5	12 48.9	48.3	75 05.6	44.6						
25	00	63 40.9	225 44.6	S 5 27.3	185 28.7	S20 24.9	27 51.6	N12 48.2	90 07.9	S12 44.6	Canopus	263 52.3	S52 42.3		
	01	78 43.4	240 44.4	28.3	200 29.3	25.3	42 54.4	48.2	105 10.3	44.5	Capella	280 22.8	N46 01.3		
	02	93 45.8	255 44.1	29.3	215 30.0	25.7	57 57.1	48.1	120 12.7	44.5	Deneb	49 26.7	N45 22.1		
	03	108 48.3	270 43.9	30.3	230 30.6	26.0	72 59.8	48.0	135 15.1	44.5	Denebola	182 26.1	N14 26.3		
04	123 50.8	285 43.7	31.3	245 31.2	26.4	88 02.6	47.9	150 17.5	44.4	Diphda	348 48.0	S17 51.4			
05	138 53.2	300 43.4	32.3	260 31.8	26.8	103 05.3	47.8	165 19.8	44.4						
06	153 55.7	315 43.2	S 5 33.3	275 32.4	S20 27.2	118 08.0	N12 47.7	180 22.2	S12 44.4	Dubhe	193 42.3	N61 37.1			
07	168 58.1	330 42.9	34.3	290 33.0	27.6	133 10.8	47.7	195 24.6	44.3	Elath	278 02.7	N28 37.7			
08	184 00.6	345 42.7	35.4	305 33.6	28.0	148 13.5	47.6	210 27.0	44.3	Eltanin	90 43.1	N51 29.2			
09	199 03.1	0 42.5	36.4	320 34.2	28.4	163 16.2	47.5	225 29.4	44.3	Enif	33 39.8	N 9 59.1			
10	214 05.5	15 42.2	37.4	335 34.8	28.8	178 19.0	47.4	240 31.7	44.2	Fomalhaut	15 15.5	S29 29.9			
11	229 08.0	30 42.0	38.4	350 35.5	29.2	193 21.7	47.3	255 34.1	44.2						
12	244 10.5	45 41.7	S 5 39.4	5 36.1	S20 29.6	208 24.4	N12 47.3	270 36.5	S12 44.1	Gacrux	171 53.1	S57 14.5			
13	259 12.9	60 41.5	40.4	20 36.7	30.0	223 27.2	47.2	285 38.9	44.1	Gienah	175 44.8	S17 40.3			
14	274 15.4	75 41.3	41.4	35 37.3	30.4	238 29.9	47.1	300 41.3	44.1	Hadar	148 38.0	S60 29.1			
15	289 17.9	90 41.0	42.4	50 37.9	30.8	253 32.6	47.0	315 43.6	44.0	Hamal	327 52.0	N23 34.6			
16	304 20.3	105 40.8	43.5	65 38.5	31.2	268 35.4	46.9	330 46.0	44.0	Kaus Aust.	83 34.1	S34 22.4			
17	319 22.8	120 40.5	44.5	80 39.1	31.6	283 38.1	46.9	345 48.4	44.0						
18	334 25.3	135 40.3	S 5 45.5	95 39.7	S20 32.0	298 40.8	N12 46.8	0 50.8	S12 43.9	Kochab	137 20.9	N74 03.3			
19	349 27.7	150 40.0	46.5	110 40.3	32.4	313 43.6	46.7	15 53.1	43.9	Markab	13 30.8	N15 20.1			
20	4 30.2	165 39.8	47.5	125 40.9	32.7	328 46.3	46.6	30 55.5	43.8	Menkar	314 06.8	N 4 11.1			
21	19 32.6	180 39.5	48.5	140 41.5	33.1	343 49.0	46.5	45 57.9	43.8	Menkent	147 59.1	S36 29.1			
22	34 35.1	195 39.3	49.5	155 42.2	33.5	358 51.8	46.5	61 00.3	43.8	Miaplacidus	221 38.2	S69 48.5			
23	49 37.6	210 39.1	50.5	170 42.8	33.9	13 54.5	46.4	76 02.7	43.7						
26	00	64 40.0	225 38.8	S 5 51.6	185 43.4	S20 34.3	28 57.2	N12 46.3	91 05.0	S12 43.7	Mirfak	308 29.1	N49 56.8		
	01	79 42.5	240 38.6	52.6	200 44.0	34.7	44 00.0	46.2	106 07.4	43.7	Nunki	75 49.2	S26 16.1		
	02	94 45.0	255 38.3	53.6	215 44.6	35.1	59 02.7	46.2	121 09.8	43.6	Peacock	53 07.5	S56 39.7		
	03	109 47.4	270 38.1	54.6	230 45.2	35.5	74 05.4	46.1	136 12.2	43.6	Pollux	243 18.2	N27 58.1		
04	124 49.9	285 37.8	55.6	245 45.8	35.9	89 08.2	46.0	151 14.5	43.5	Procyon	244 51.6	N 5 09.9			
05	139 52.4	300 37.6	56.6	260 46.4	36.3	104 10.9	45.9	166 16.9	43.5						
06	154 54.8	315 37.3	S 5 57.6	275 47.0	S20 36.6	119 13.6	N12 45.8	181 19.3	S12 43.5	Rasalhague	95 59.8	N12 32.6			
07	169 57.3	330 37.1	58.6	290 47.6	37.0	134 16.3	45.8	196 21.7	43.4	Regulus	207 35.4	N11 51.1			
08	184 59.8	345 36.8	5 59.7	305 48.2	37.4	149 19.1	45.7	211 24.0	43.4	Rigel	281 04.5	S 8 10.4			
09	200 02.2	0 36.6	6 00.7	320 48.8	37.8	164 21.8	45.6	226 26.4	43.4	Rigil Kent.	139 42.3	S60 55.8			
10	215 04.7	15 36.3	01.7	335 49.4	38.2	179 24.5	45.5	241 28.8	43.3	Sabik	102 04.2	S15 45.2			
11	230 07.1	30 36.1	02.7	350 50.0	38.6	194 27.3	45.4	256 31.2	43.3						
12	245 09.6	45 35.8	S 6 03.7	5 50.6	S20 39.0	209 30.0	N12 45.4	271 33.5	S12 43.2	Schedar	349 31.8	N56 40.3			
13	260 12.1	60 35.6	04.7	20 51.2	39.4	224 32.7	45.3	286 35.9	43.2	Shaula	96 12.1	S37 07.3			
14	275 14.5	75 35.3	05.7	35 51.8	39.7	239 35.5	45.2	301 38.3	43.2	Sirius	258 26.8	S16 44.8			
15	290 17.0	90 35.1	06.7	50 52.4	40.1	254 38.2	45.1	316 40.7	43.1	Spica	158 23.6	S11 17.0			
16	305 19.5	105 34.8	07.8	65 53.0	40.5	269 40.9	45.1	331 43.0	43.1	Suhail	222 46.9	S43 31.4			
17	320 21.9	120 34.6	08.8	80 53.7	40.9	284 43.6	45.0	346 45.4	43.0						
18	335 24.4	135 34.3	S 6 09.8	95 54.3	S20 41.3	299 46.4	N12 44.9	1 47.8	S12 43.0	Vega	80 34.2	N38 48.5			
19	350 26.9	150 34.0	10.8	110 54.9	41.7	314 49.1	44.8	16 50.2	43.0	Zuben'ubi	136 57.4	S16 08.3			
20	5 29.3	165 33.8	11.8	125 55.5	42.0	329 51.8	44.7	31 52.5	42.9						
21	20 31.8	180 33.5	12.8	140 56.1	42.4	344 54.5	44.7	46 54.9	42.9						
22	35 34.2	195 33.3	13.8	155 56.7	42.8	359 57.3	44.6	61 57.3	42.8	Venus	162 03.7	h 8 57			
23	50 36.7	210 33.0	14.8	170 57.3	43.2	15 00.0	44.5	76 59.6	42.8	Mars	121 47.8	h 11 38			
		h m									Jupiter	324 10.7	22 05		
Mer.Pass. 19		42.0	v -0.2	d 1.0	v 0.6	d 0.4	v 2.7	d 0.1	v 2.4	d 0.0	Saturn	26 27.0	17 57		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise			
										24	25		26	27		
	GHA	Dec	GHA	γ	Dec	d	HP	Naut.							Civil	h m
d h	° /	° /	° /		° /			°	h m	h m	h m	h m	h m	h m	h m	h m
24	00	183 23.1 S20 26.8	45 50.3 12.0 N	6 32.0 16.3 59.1				N 72	07 32	09 20		13 12	12 11			
	01	198 22.9 27.3	60 21.3 11.9	6 48.3 16.2 59.1				N 70	07 18	08 49	11 24	13 27	12 46			
	02	213 22.7 27.8	74 52.2 11.8	7 04.5 16.3 59.0				68	07 07	08 25	10 01	13 40	13 12	12 20		
	03	228 22.6 28.3	89 23.0 11.9	7 20.8 16.2 59.0				66	06 57	08 07	09 24	13 50	13 32	13 04		
	04	243 22.4 28.8	103 53.9 11.8	7 37.0 16.1 59.0				64	06 49	07 52	08 58	13 58	13 48	13 34	13 08	
	05	258 22.2 29.3	118 24.7 11.8	7 53.1 16.1 59.0				62	06 42	07 40	08 38	14 06	14 01	13 57	13 52	
	06	273 22.0 S20 29.8	132 55.5 11.8 N	8 09.2 16.0 59.0				60	06 35	07 29	08 21	14 12	14 13	14 15	14 21	
	07	288 21.9 30.3	147 26.3 11.7	8 25.2 16.0 59.0				N 58	06 30	07 20	08 07	14 18	14 23	14 30	14 44	
	08	303 21.7 30.8	161 57.0 11.7	8 41.2 16.0 59.0				56	06 24	07 11	07 56	14 23	14 32	14 44	15 02	
	09	318 21.5 31.4	176 27.7 11.6	8 57.2 15.9 59.0				54	06 19	07 04	07 45	14 27	14 39	14 55	15 18	
FRI DAY	10	333 21.3 31.9	190 58.3 11.6	9 13.1 15.9 59.0				52	06 15	06 57	07 36	14 32	14 46	15 05	15 32	
	11	348 21.1 32.4	205 28.9 11.6	9 29.0 15.8 58.9				50	06 11	06 51	07 28	14 35	14 53	15 15	15 43	
	12	3 21.0 S20 32.9	219 59.5 11.5 N	9 44.8 15.7 58.9				45	06 01	06 38	07 10	14 44	15 07	15 34	16 08	
	13	18 20.8 33.4	234 30.0 11.5	10 00.5 15.7 58.9				N 40	05 53	06 26	06 56	14 51	15 18	15 50	16 28	
	14	33 20.6 33.9	249 00.5 11.5	10 16.2 15.6 58.9				35	05 45	06 16	06 44	14 57	15 28	16 03	16 45	
	15	48 20.4 34.4	263 31.0 11.4	10 31.8 15.6 58.9				30	05 38	06 07	06 33	15 02	15 37	16 15	16 59	
	16	63 20.2 34.9	278 01.4 11.3	10 47.4 15.5 58.9				N 20	05 24	05 51	06 15	15 11	15 52	16 36	17 24	
	17	78 20.1 35.4	292 31.7 11.3	11 02.9 15.4 58.9				0	05 10	05 36	05 58	15 20	16 05	16 53	17 45	
	18	93 19.9 S20 35.9	307 02.0 11.3 N11	18.3 15.4 58.9				S 10	04 39	05 05	05 28	15 35	16 30	17 27	18 25	
	19	108 19.7 36.4	321 32.3 11.2	11 33.7 15.4 58.8				20	04 19	04 47	05 11	15 44	16 44	17 45	18 47	
SATURDAY	20	123 19.5 36.9	336 02.5 11.2	11 49.1 15.2 58.8				30	03 53	04 26	04 52	15 54	16 59	18 06	19 12	
	21	138 19.3 37.4	350 32.7 11.1	12 04.3 15.2 58.8				35	03 37	04 12	04 41	15 59	17 09	18 18	19 27	
	22	153 19.1 37.9	5 02.8 11.1	12 19.5 15.1 58.8				40	03 17	03 57	04 28	16 06	17 19	18 33	19 45	
	23	168 19.0 38.4	19 32.9 11.0	12 34.6 15.0 58.8				45	02 52	03 37	04 13	16 13	17 32	18 50	20 06	
	00	183 18.8 S20 38.9	34 02.9 11.0 N12	49.6 15.0 58.8				S 50	02 16	03 12	03 54	16 23	17 47	19 11	20 32	
	01	198 18.6 39.4	48 32.9 11.0	13 04.6 14.9 58.8				52	01 57	03 00	03 45	16 27	17 54	19 21	20 45	
	02	213 18.4 39.9	63 02.9 10.8	13 19.5 14.8 58.7				54	01 32	02 46	03 34	16 32	18 02	19 33	21 00	
	03	228 18.2 40.4	77 32.7 10.8	13 34.3 14.8 58.7				56	00 55	02 29	03 23	16 37	18 11	19 46	21 18	
	04	243 18.0 40.9	92 02.5 10.8	13 49.1 14.6 58.7				58	////	02 09	03 10	16 43	18 21	20 01	21 39	
	05	258 17.9 41.4	106 32.3 10.7	14 03.7 14.6 58.7				S 60	////	01 42	02 54	16 50	18 33	20 20	22 07	
SUNDAY	06	273 17.7 S20 41.8	121 02.0 10.7 N14	18.3 14.5 58.7				Lat.	Sunset	Twilight		Moonset				
	07	288 17.5 42.3	135 31.7 10.6	14 32.8 14.4 58.7						Civil	Naut.	24	25	26	27	
	08	303 17.3 42.8	150 01.3 10.5	14 47.2 14.4 58.7												
	09	318 17.1 43.3	164 30.8 10.5	15 01.6 14.2 58.6												
	10	333 16.9 43.8	179 00.3 10.4	15 15.8 14.2 58.6												
	11	348 16.7 44.3	193 29.7 10.4	15 30.0 14.0 58.6				N 72		14 12	16 00	04 44	07 30			
	12	3 16.6 S20 44.8	207 59.1 10.3 N15	44.0 14.0 58.6				N 70	12 09	14 44	16 15	04 31	06 57			
	13	18 16.4 45.3	222 28.4 10.3	15 58.0 13.9 58.6				68	13 32	15 08	16 26	04 22	06 33	09 14		
	14	33 16.2 45.8	236 57.7 10.2	16 11.9 13.8 58.6				66	14 09	15 26	16 36	04 14	06 15	08 31		
	15	48 16.0 46.3	251 26.9 10.1	16 25.7 13.7 58.5				64	14 35	15 41	16 44	04 07	06 00	08 02	10 22	
26	16	63 15.8 46.7	265 56.0 10.1	16 39.4 13.6 58.5				62	14 55	15 53	16 51	04 01	05 48	07 40	09 38	
	17	78 15.6 47.2	280 25.1 10.0	16 53.0 13.5 58.5				60	15 12	16 04	16 58	03 57	05 38	07 23	09 10	
	18	93 15.4 S20 47.7	294 54.1 9.9 N17	06.5 13.4 58.5				N 58	15 26	16 14	17 04	03 52	05 29	07 08	08 48	
	19	108 15.2 48.2	309 23.0 9.9	17 19.9 13.3 58.5				56	15 38	16 22	17 09	03 48	05 21	06 56	08 30	
	20	123 15.0 48.7	323 51.9 9.8	17 33.2 13.2 58.4				54	15 48	16 29	17 14	03 45	05 14	06 45	08 15	
	21	138 14.9 49.2	338 20.7 9.8	17 46.4 13.0 58.4				52	15 57	16 36	17 18	03 42	05 08	06 35	08 02	
	22	153 14.7 49.6	352 49.5 9.7	17 59.4 13.0 58.4				50	16 06	16 42	17 23	03 39	05 02	06 27	07 50	
	23	168 14.5 50.1	7 18.2 9.6	18 12.4 12.9 58.4				45	16 23	16 56	17 32	03 33	04 51	06 09	07 26	
	00	183 14.3 S20 50.6	21 46.8 9.6 N18	25.3 12.8 58.4				N 40	16 38	17 07	17 40	03 28	04 41	05 54	07 07	
	01	198 14.1 51.1	36 15.4 9.5	18 38.1 12.7 58.4				35	16 50	17 17	17 48	03 24	04 32	05 42	06 52	
02	213 13.9 51.6	50 43.9 9.5	18 50.8 12.5 58.3				30	17 01	17 26	17 56	03 20	04 25	05 31	06 38		
03	228 13.7 52.0	65 12.4 9.4	19 03.3 12.4 58.3				20	17 19	17 43	18 10	03 13	04 12	05 13	06 15		
04	243 13.5 52.5	79 40.8 9.3	19 15.7 12.4 58.3				N 10	17 35	17 58	18 24	03 07	04 01	04 57	05 55		
05	258 13.3 53.0	94 09.1 9.2	19 28.1 12.2 58.3				0	17 51	18 13	18 38	03 02	03 51	04 42	05 36		
27	06	273 13.1 S20 53.5	108 37.3 9.2 N19	40.3 12.1 58.3				S 10	18 06	18 29	18 55	02 57	03 41	04 27	05 18	
	07	288 12.9 54.0	123 05.5 9.1	19 52.4 11.9 58.2				20	18 23	18 47	19 15	02 51	03 30	04 12	04 58	
	08	303 12.7 54.4	137 33.6 9.1	20 04.3 11.9 58.2				30	18 42	19 09	19 41	02 44	03 17	03 54	04 35	
	09	318 12.5 54.9	152 01.7 9.0	20 16.2 11.7 58.2				35	18 53	19 22	19 57	02 41	03 10	03 43	04 22	
	10	333 12.3 55.4	166 29.7 8.9	20 27.9 11.7 58.2				40	19 06	19 38	20 17	02 36	03 02	03 32	04 06	
	11	348 12.2 55.9	180 57.6 8.9	20 39.6 11.4 58.1				45	19 22	19 57	20 43	02 32	02 53	03 18	03 48	
	12	3 12.0 S20 56.3	195 25.5 8.8 N20	51.0 11.4 58.1				S 50	19 41	20 22	21 19	02 26	02 42	03 01	03 26	
	13	18 11.8 56.8	209 53.3 8.8	21 02.4 11.3 58.1				52	19 50	20 35	21 39	02 23	02 37	02 53	03 15	
	14	33 11.6 57.3	224 21.1 8.7	21 13.7 11.1 58.1				54	20 00	20 49	22 05	02 20	02 31	02 44	03 03	
	15	48 11.4 57.7	238 48.8 8.6	21 24.8 11.0 58.1				56	20 12	21 06	22 44	02 17	02 25	02 35	02 49	
16	63 11.2 58.2	253 16.4 8.5	21 35.8 10.8 58.0				58	20 25	21 27	////	02 14	02 18	02 23	02 33		
17	78 11.0 58.7	267 43.9 8.5	21 46.6 10.7 58.0				S 60	20 41	21 55	////	02 10	02 10	02 11	02 14		
18	93 10.8 S20 59.2	282 11.4 8.5 N21	57.3 10.6 58.0				SUN			MOON						
19	108 10.6 20 59.6	296 38.9 8.4	22 07.9 10.5 58.0				Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase		
20	123 10.4 21 00.1	311 06.3 8.3	22 18.4 10.3 57.9					00 ^h	12 ^h	Pass.	Upper	Lower				
21	138 10.2 00.6	325 33.6 8.2	22 28.7 10.2 57.9				d	m s	m s	h m	h m	h m	d %			
22	153 10.0 01.0	340														

UT	ARIES		VENUS −4.2		MARS +1.4		JUPITER −2.8		SATURN +0.8		STARS		
	GHA	GHA Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
MONDAY	00	65 39.2	225 32.8 S 6 15.9	185 57.9 S20 43.6	30 02.7 N12 44.4	92 02.0 S12 42.8	Acamar	315 12.1 S40 12.6					
	01	80 41.6	240 32.5 16.9	200 58.5 44.0	45 05.4 44.4	107 04.4 42.7	Achernar	335 20.4 S57 07.1					
	02	95 44.1	255 32.3 17.9	215 59.1 44.3	60 08.2 44.3	122 06.8 42.7	Acruhr	173 01.5 S63 13.6					
	03	110 46.6	270 32.0 18.9	230 59.7 44.7	75 10.9 44.2	137 09.1 42.7	Adhara	255 06.3 S29 00.1					
	04	125 49.0	285 31.7 19.9	246 00.3 45.1	90 13.6 44.1	152 11.5 42.6	Aldebaran	290 40.4 N16 33.5					
	05	140 51.5	300 31.5 20.9	261 00.9 45.5	105 16.3 44.0	167 13.9 42.6							
	06	155 54.0	315 31.2 S 6 21.9	276 01.5 S20 45.9	120 19.1 N12 44.0	182 16.3 S12 42.5	Alioth	166 14.1 N55 49.6					
	07	170 56.4	330 31.0 22.9	291 02.1 46.3	135 21.8 43.9	197 18.6 42.5	Alkaid	152 53.1 N49 11.5					
	08	185 58.9	345 30.7 24.0	306 02.7 46.6	150 24.5 43.8	212 21.0 42.5	Alnair	27 34.1 S46 51.0					
	09	201 01.4	0 30.4 25.0	321 03.3 47.0	165 27.2 43.7	227 23.4 42.4	Alnilam	275 38.4 S 1 11.1					
	10	216 03.8	15 30.2 26.0	336 03.9 47.4	180 30.0 43.7	242 25.7 42.4	Alphard	217 48.6 S 8 45.6					
	11	231 06.3	30 29.9 27.0	351 04.5 47.8	195 32.7 43.6	257 28.1 42.3							
	12	246 08.7	45 29.7 S 6 28.0	6 05.1 S20 48.1	210 35.4 N12 43.5	272 30.5 S12 42.3	Alphecca	126 04.9 N26 38.1					
	13	261 11.2	60 29.4 29.0	21 05.7 48.5	225 38.1 43.4	287 32.9 42.3	Alpheratz	357 35.6 N29 13.5					
	14	276 13.7	75 29.1 30.0	36 06.3 48.9	240 40.9 43.4	302 35.2 42.2	Altair	62 01.1 N 8 55.9					
	15	291 16.1	90 28.9 31.0	51 06.9 49.3	255 43.6 43.3	317 37.6 42.2	Ankaa	353 07.9 S42 10.8					
	16	306 18.6	105 28.6 32.0	66 07.4 49.7	270 46.3 43.2	332 40.0 42.1	Antares	112 17.4 S26 29.0					
	17	321 21.1	120 28.4 33.1	81 08.0 50.0	285 49.0 43.1	347 42.3 42.1							
	18	336 23.5	135 28.1 S 6 34.1	96 08.6 S20 50.4	300 51.7 N12 43.1	2 44.7 S12 42.1	Arcturus	145 49.1 N19 03.5					
	19	351 26.0	150 27.8 35.1	111 09.2 50.8	315 54.5 43.0	17 47.1 42.0	Atria	107 13.0 S69 04.2					
	20	6 28.5	165 27.6 36.1	126 09.8 51.2	330 57.2 42.9	32 49.4 42.0	Avior	234 14.8 S59 34.8					
	21	21 30.9	180 27.3 37.1	141 10.4 51.5	345 59.9 42.8	47 51.8 41.9	Bellatrix	278 23.6 N 6 22.3					
	22	36 33.4	195 27.0 38.1	156 11.0 51.9	1 02.6 42.8	62 54.2 41.9	Betelgeuse	270 52.8 N 7 24.7					
	23	51 35.9	210 26.8 39.1	171 11.6 52.3	16 05.3 42.7	77 56.6 41.9							
TUESDAY	00	66 38.3	225 26.5 S 6 40.1	186 12.2 S20 52.7	31 08.1 N12 42.6	92 58.9 S12 41.8	Canopus	263 52.3 S52 42.3					
	01	81 40.8	240 26.2 41.2	201 12.8 53.0	46 10.8 42.5	108 01.3 41.8	Capella	280 22.8 N46 01.3					
	02	96 43.2	255 26.0 42.2	216 13.4 53.4	61 13.5 42.5	123 03.7 41.7	Deneb	49 26.7 N45 22.1					
	03	111 45.7	270 25.7 43.2	231 14.0 53.8	76 16.2 42.4	138 06.0 41.7	Denebola	182 26.0 N14 26.3					
	04	126 48.2	285 25.4 44.2	246 14.6 54.2	91 18.9 42.3	153 08.4 41.6	Diphda	348 48.1 S17 51.4					
	05	141 50.6	300 25.2 45.2	261 15.2 54.5	106 21.7 42.2	168 10.8 41.6							
	06	156 53.1	315 24.9 S 6 46.2	276 15.8 S20 54.9	121 24.4 N12 42.2	183 13.1 S12 41.6	Dubhe	193 42.3 N61 37.1					
	07	171 55.6	330 24.6 47.2	291 16.4 55.3	136 27.1 42.1	198 15.5 41.5	Elnath	278 02.7 N28 37.7					
	08	186 58.0	345 24.4 48.2	306 17.0 55.7	151 29.8 42.0	213 17.9 41.5	Eltanin	90 43.1 N51 29.2					
	09	202 00.5	0 24.1 49.3	321 17.6 56.0	166 32.5 41.9	228 20.2 41.4	Enif	33 39.8 N 9 59.1					
	10	217 03.0	15 23.8 50.3	336 18.2 56.4	181 35.3 41.9	243 22.6 41.4	Fomalhaut	15 15.5 S29 29.9					
	11	232 05.4	30 23.6 51.3	351 18.7 56.8	196 38.0 41.8	258 25.0 41.4							
	12	247 07.9	45 23.3 S 6 52.3	6 19.3 S20 57.1	211 40.7 N12 41.7	273 27.3 S12 41.3	Gacrux	171 53.0 S57 14.5					
	13	262 10.4	60 23.0 53.3	21 19.9 57.5	226 43.4 41.6	288 29.7 41.3	Gienah	175 44.7 S17 40.3					
	14	277 12.8	75 22.7 54.3	36 20.5 57.9	241 46.1 41.6	303 32.1 41.2	Hadar	148 37.9 S60 29.0					
	15	292 15.3	90 22.5 55.3	51 21.1 58.3	256 48.8 41.5	318 34.4 41.2	Hamal	327 52.0 N23 34.6					
	16	307 17.7	105 22.2 56.3	66 21.7 58.6	271 51.6 41.4	333 36.8 41.2	Kaus Aust.	83 34.1 S34 22.4					
	17	322 20.2	120 21.9 57.3	81 22.3 59.0	286 54.3 41.3	348 39.2 41.1							
	18	337 22.7	135 21.6 S 6 58.4	96 22.9 S20 59.4	301 57.0 N12 41.3	3 41.5 S12 41.1	Kochab	137 20.9 N74 03.3					
	19	352 25.1	150 21.4 6 59.4	111 23.5 20 59.7	316 59.7 41.2	18 43.9 41.0	Markab	13 30.8 N15 20.1					
	20	7 27.6	165 21.1 7 00.4	126 24.1 21 00.1	332 02.4 41.1	33 46.3 41.0	Menkar	314 06.8 N 4 11.1					
	21	22 30.1	180 20.8 01.4	141 24.7 00.5	347 05.1 41.0	48 48.6 40.9	Menkent	147 59.1 S36 29.0					
	22	37 32.5	195 20.6 02.4	156 25.2 00.8	2 07.9 41.0	63 51.0 40.9	Miaplacidus	221 38.2 S69 48.5					
	23	52 35.0	210 20.3 03.4	171 25.8 01.2	17 10.6 40.9	78 53.4 40.9							
WEDNESDAY	00	67 37.5	225 20.0 S 7 04.4	186 26.4 S21 01.6	32 13.3 N12 40.8	93 55.7 S12 40.8	Mirfak	308 29.1 N49 56.8					
	01	82 39.9	240 19.7 05.4	201 27.0 01.9	47 16.0 40.7	108 58.1 40.8	Nunki	75 49.2 S26 16.1					
	02	97 42.4	255 19.4 06.4	216 27.6 02.3	62 18.7 40.7	124 00.5 40.7	Peacock	53 07.5 S56 39.7					
	03	112 44.9	270 19.2 07.5	231 28.2 02.7	77 21.4 40.6	139 02.8 40.7	Pollux	243 18.2 N27 58.1					
	04	127 47.3	285 18.9 08.5	246 28.8 03.0	92 24.1 40.5	154 05.2 40.7	Procyon	244 51.6 N 5 09.9					
	05	142 49.8	300 18.6 09.5	261 29.4 03.4	107 26.9 40.5	169 07.5 40.6							
	06	157 52.2	315 18.3 S 7 10.5	276 30.0 S21 03.8	122 29.6 N12 40.4	184 09.9 S12 40.6	Rasalhague	95 59.8 N12 32.6					
	07	172 54.7	330 18.1 11.5	291 30.5 04.1	137 32.3 40.3	199 12.3 40.5	Regulus	207 35.4 N11 51.1					
	08	187 57.2	345 17.8 12.5	306 31.1 04.5	152 35.0 40.2	214 14.6 40.5	Rigel	281 04.4 S 8 10.4					
	09	202 59.6	0 17.5 13.5	321 31.7 04.9	167 37.7 40.2	229 17.0 40.4	Rigel Kent.	139 42.2 S60 55.8					
	10	218 02.1	15 17.2 14.5	336 32.3 05.2	182 40.4 40.1	244 19.4 40.4	Sabik	102 04.2 S15 45.2					
	11	233 04.6	30 16.9 15.5	351 32.9 05.6	197 43.1 40.0	259 21.7 40.4							
	12	248 07.0	45 16.7 S 7 16.5	6 33.5 S21 06.0	212 45.8 N12 39.9	274 24.1 S12 40.3	Schedar	349 31.8 N56 40.3					
	13	263 09.5	60 16.4 17.6	21 34.1 06.3	227 48.5 39.9	289 26.5 40.3	Shaula	96 12.1 S37 07.3					
	14	278 12.0	75 16.1 18.6	36 34.7 06.7	242 51.3 39.8	304 28.8 40.2	Sirius	258 26.8 S16 44.8					
	15	293 14.4	90 15.8 19.6	51 35.2 07.1	257 54.0 39.7	319 31.2 40.2	Spica	158 23.5 S11 17.0					
	16	308 16.9	105 15.5 20.6	66 35.8 07.4	272 56.7 39.7	334 33.5 40.1	Suhail	222 46.9 S43 31.4					
	17	323 19.4	120 15.3 21.6	81 36.4 07.8	287 59.4 39.6	349 35.9 40.1							
	18	338 21.8	135 15.0 S 7 22.6	96 37.0 S21 08.1	303 02.1 N12 39.5	4 38.3 S12 40.1	Vega	80 34.2 N38 48.4					
	19	353 24.3	150 14.7 23.6	111 37.6 08.5	318 04.8 39.4	19 40.6 40.0	Zuben'ubi	136 57.4 S16 08.3					
	20	8 26.7	165 14.4 24.6	126 38.2 08.9	333 07.5 39.4	34 43.0 40.0							
	21	23 29.2	180 14.1 25.6	141 38.7 09.2	348 10.2 39.3	49 45.3 39.9							
	22	38 31.7	195 13.8 26.6	156 39.3 09.6	3 12.9 39.2	64 47.7 39.9	Venus	158 48.2 h 8 58					
	23	53 34.1	210 13.5 27.7	171 39.9 09.9	18 15.6 39.2	79 50.1 39.8	Mars	119 33.9 h 11 35					
Mer. Pass. 19 30.2		v −0.3 d 1.0		v 0.6 d 0.4		v 2.7 d 0.1		v 2.4 d 0.0		SHA Mer. Pass.			
										Jupiter 324 29.8 21 52			
										Saturn 26 20.6 17 45			

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA	ν	Dec	d	HP		Naut.	Civil		27	28	29	30					
	$^{\circ}$	$'$	$^{\circ}$	$'$	$^{\circ}$	$'$	$^{\circ}$	$'$		$^{\circ}$	h	m	h	m	h	m	h	m			
MONDAY	d h	$^{\circ}$	$'$ <td>$^{\circ}$</td> <td>$'$<td>$^{\circ}$</td><td>$'$<td>$^{\circ}$</td><td>$'$<td>$^{\circ}$</td><td>$'$<td>h</td><td>m</td><td>h</td><td>m</td><td>h</td><td>m</td></td></td></td></td>	$^{\circ}$	$'$ <td>$^{\circ}$</td> <td>$'$<td>$^{\circ}$</td><td>$'$<td>$^{\circ}$</td><td>$'$<td>h</td><td>m</td><td>h</td><td>m</td><td>h</td><td>m</td></td></td></td>	$^{\circ}$	$'$ <td>$^{\circ}$</td> <td>$'$<td>$^{\circ}$</td><td>$'$<td>h</td><td>m</td><td>h</td><td>m</td><td>h</td><td>m</td></td></td>	$^{\circ}$	$'$ <td>$^{\circ}$</td> <td>$'$<td>h</td><td>m</td><td>h</td><td>m</td><td>h</td><td>m</td></td>	$^{\circ}$	$'$ <td>h</td> <td>m</td> <td>h</td> <td>m</td> <td>h</td> <td>m</td>	h	m	h	m	h	m				
	27 00	183	09.6	S21	02.0	8	55.2	8.0	N22	58.9	9.8	57.9									
	01	198	09.4		02.4	23	22.2	8.1	23	08.7	9.6	57.8									
	02	213	09.2		02.9	37	49.3	7.9	23	18.3	9.5	57.8									
	03	228	09.0		03.3	52	16.2	8.0	23	27.8	9.3	57.8									
	04	243	08.8		03.8	66	43.2	7.8	23	37.1	9.3	57.8									
	05	258	08.6		04.3	81	10.0	7.8	23	46.4	9.0	57.7									
	06	273	08.4	S21	04.7	95	36.8	7.8	N23	55.4	8.9	57.7									
	07	288	08.2		05.2	110	03.6	7.7	24	04.3	8.8	57.7									
	08	303	08.0		05.6	124	30.3	7.6	24	13.1	8.6	57.7									
	09	318	07.8		06.1	138	56.9	7.6	24	21.7	8.5	57.6									
	10	333	07.6		06.6	153	23.5	7.6	24	30.2	8.4	57.6									
	11	348	07.4		07.0	167	50.1	7.5	24	38.6	8.1	57.6									
	12	3	07.2	S21	07.5	182	16.6	7.4	N24	46.7	8.1	57.6									
	13	18	07.0		07.9	196	43.0	7.4	24	54.8	7.9	57.5									
	14	33	06.8		08.4	211	09.4	7.4	25	02.7	7.7	57.5									
	15	48	06.6		08.8	225	35.8	7.3	25	10.4	7.6	57.5									
	16	63	06.4		09.3	240	02.1	7.3	25	18.0	7.4	57.5									
	17	78	06.2		09.8	254	28.4	7.2	25	25.4	7.2	57.4									
	18	93	06.0	S21	10.2	268	54.6	7.2	N25	32.6	7.1	57.4									
	19	108	05.7		10.7	283	20.8	7.2	25	39.7	7.0	57.4									
	20	123	05.5		11.1	297	47.0	7.1	25	46.7	6.8	57.4									
	21	138	05.3		11.6	312	13.1	7.1	25	53.5	6.6	57.3									
	22	153	05.1		12.0	326	39.2	7.0	26	00.1	6.5	57.3									
	23	168	04.9		12.5	341	05.2	7.1	26	06.6	6.3	57.3									
TUESDAY	28 00	183	04.7	S21	12.9	355	31.3	7.0	N26	12.9	6.2	57.3									
	01	198	04.5		13.4	9	57.3	6.9	26	19.1	6.0	57.2									
	02	213	04.3		13.8	24	23.2	6.9	26	25.1	5.8	57.2									
	03	228	04.1		14.2	38	49.1	7.0	26	30.9	5.7	57.2									
	04	243	03.9		14.7	53	15.1	6.8	26	36.6	5.5	57.1									
	05	258	03.7		15.1	67	40.9	6.9	26	42.1	5.4	57.1									
	06	273	03.5	S21	15.6	82	06.8	6.8	N26	47.5	5.2	57.1									
	07	288	03.3		16.0	96	32.6	6.8	26	52.7	5.0	57.1									
	08	303	03.1		16.5	110	58.4	6.8	26	57.7	4.9	57.0									
	09	318	02.8		16.9	125	24.2	6.8	27	02.6	4.7	57.0									
	10	333	02.6		17.3	139	50.0	6.8	27	07.3	4.5	57.0									
	11	348	02.4		17.8	154	15.8	6.7	27	11.8	4.4	57.0									
	12	3	02.2	S21	18.2	168	41.5	6.8	N27	16.2	4.2	56.9									
	13	18	02.0		18.7	183	07.3	6.7	27	20.4	4.1	56.9									
	14	33	01.8		19.1	197	33.0	6.7	27	24.5	3.9	56.9									
	15	48	01.6		19.5	211	58.7	6.8	27	28.4	3.7	56.9									
	16	63	01.4		20.0	226	24.5	6.7	27	32.1	3.6	56.8									
	17	78	01.2		20.4	240	50.2	6.7	27	35.7	3.3	56.8									
	18	93	01.0	S21	20.9	255	15.9	6.7	N27	39.0	3.3	56.8									
	19	108	00.7		21.3	269	41.6	6.7	27	42.3	3.0	56.7									
	20	123	00.5		21.7	284	07.3	6.7	27	45.3	2.9	56.7									
	21	138	00.3		22.2	298	33.0	6.8	27	48.2	2.7	56.7									
	22	153	00.1		22.6	312	58.8	6.7	27	50.9	2.6	56.7									
	23	167	59.9		23.0	327	24.5	6.7	27	53.5	2.4	56.6									
	WEDNESDAY	29 00	182	59.7	S21	23.5	341	50.2	6.8	N27	55.9	2.2	56.6								
01		197	59.5		23.9	356	16.0	6.7	27	58.1	2.1	56.6									
02		212	59.2		24.3	10	41.7	6.8	28	00.2	1.9	56.6									
03		227	59.0		24.7	25	07.5	6.8	28	02.1	1.8	56.5									
04		242	58.8		25.2	39	33.3	6.8	28	03.9	1.5	56.5									
05		257	58.6		25.6	53	59.1	6.9	28	05.4	1.4	56.5									
06		272	58.4	S21	26.0	68	25.0	6.8	N28	06.8	1.3	56.4									
07		287	58.2		26.5	82	50.8	6.9	28	08.1	1.1	56.4									
08		302	57.9		26.9	97	16.7	6.9	28	09.2	0.9	56.4									
09		317	57.7		27.3	111	42.6	6.9	28	10.1	0.8	56.4									
10		332	57.5		27.7	126	08.5	7.0	28	10.9	0.6	56.3									
11		347	57.3		28.2	140	34.5	7.0	28	11.5	0.4	56.3									
12		2	57.1	S21	28.6	155	00.5	7.0	N28	11.9	0.3	56.3									
13		17	56.9		29.0	169	26.5	7.1	28	12.2	0.1	56.3									
14		32	56.6		29.4	183	52.6	7.1	28	12.3	0.1	56.2									
15		47	56.4		29.8	198	18.7	7.1	28	12.2	0.2	56.2									
16		62	56.2		30.3	212	44.8	7.2	28	12.0	0.4	56.2									
17		77	56.0		30.7	227	11.0	7.2	28	11.6	0.5	56.2									
18		92	55.8	S21	31.1	241	37.2	7.3	N28	11.1	0.7	56.1									
19		107	55.5		31.5	256	03.5	7.3	28	10.4	0.8	56.1									
20		122	55.3		31.9	270	29.8	7.3	28	09.6	1.0	56.1									
21		137	55.1		32.4	284	56.1	7.4	28	08.6	1.2	56.0									
22		152	54.9		32.8	299	22.5	7.5	28	07.4	1.3	56.0									
23		167	54.7		33.2	313	49.0	7.5	N28	06.1	1.5	56.0									
		SD	16.2	d	0.4	SD	15.7	15.5	15.3												
									SUN		Mer.		Mer. Pass.		Age		Phase				
									Eqn. of Time		Pass.		Upper		Lower						
									00^h	12^h											
									d	m	s	h	m	h	m	d		$\%$			
									27	12	39	12	29	11	48	24	19	11	51	14	100
									28	12	19	12	09	11	48	00	19	12	47	15	98
									29	11	59	11	49	11	48	01	16	13	44	16	95

UT	ARIES		VENUS -4.2		MARS +1.4		JUPITER -2.8		SATURN +0.8		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
T H U R S D A Y	00	68 36.6	225 13.3 S 7 28.7	186 40.5 S21 10.3	33 18.4 N12 39.1	94 52.4 S12 39.8	Acamar	315 12.1 S40 12.6					
	01	83 39.1	240 13.0 29.7	201 41.1 10.7	48 21.1 39.0	109 54.8 39.8	Achernar	335 20.4 S57 07.1					
	02	98 41.5	255 12.7 30.7	216 41.7 11.0	63 23.8 38.9	124 57.2 39.7	Acrux	173 01.5 S63 13.6					
	03	113 44.0	270 12.4 . 31.7	231 42.2 . 11.4	78 26.5 . 38.9	139 59.5 . 39.7	Adhara	255 06.3 S29 00.1					
	04	128 46.5	285 12.1 32.7	246 42.8 11.7	93 29.2 38.8	155 01.9 39.6	Aldebaran	290 40.3 N16 33.5					
	05	143 48.9	300 11.8 33.7	261 43.4 12.1	108 31.9 38.7	170 04.2 39.6							
	06	158 51.4	315 11.5 S 7 34.7	276 44.0 S21 12.5	123 34.6 N12 38.7	185 06.6 S12 39.5	Alioth	166 14.1 N55 49.6					
	07	173 53.9	330 11.2 35.7	291 44.6 12.8	138 37.3 38.6	200 09.0 39.5	Alkaid	152 53.1 N49 11.5					
	08	188 56.3	345 11.0 36.7	306 45.2 13.2	153 40.0 38.5	215 11.3 39.4	Alnair	27 34.2 S46 51.0					
	09	203 58.8	0 10.7 . 37.7	321 45.7 . 13.5	168 42.7 . 38.5	230 13.7 . 39.4	Alnilam	275 38.4 S 1 11.1					
	10	219 01.2	15 10.4 38.8	336 46.3 13.9	183 45.4 38.4	245 16.0 39.4	Alphard	217 48.6 S 8 45.6					
	11	234 03.7	30 10.1 39.8	351 46.9 14.2	198 48.1 38.3	260 18.4 39.3							
	12	249 06.2	45 09.8 S 7 40.8	6 47.5 S21 14.6	213 50.8 N12 38.2	275 20.8 S12 39.3	Alphecca	126 04.9 N26 38.0					
	13	264 08.6	60 09.5 41.8	21 48.1 15.0	228 53.5 38.2	290 23.1 39.2	Alpheratz	357 35.6 N29 13.5					
	14	279 11.1	75 09.2 42.8	36 48.6 15.3	243 56.2 38.1	305 25.5 39.2	Altair	62 01.1 N 8 55.9					
	15	294 13.6	90 08.9 . 43.8	51 49.2 . 15.7	258 58.9 . 38.0	320 27.8 . 39.1	Ankaa	353 07.9 S42 10.8					
	16	309 16.0	105 08.6 44.8	66 49.8 16.0	274 01.7 38.0	335 30.2 39.1	Antares	112 17.4 S26 29.0					
	17	324 18.5	120 08.3 45.8	81 50.4 16.4	289 04.4 37.9	350 32.5 39.0							
	18	339 21.0	135 08.0 S 7 46.8	96 51.0 S21 16.7	304 07.1 N12 37.8	5 34.9 S12 39.0	Arcturus	145 49.1 N19 03.5					
	19	354 23.4	150 07.8 47.8	111 51.5 17.1	319 09.8 37.8	20 37.3 39.0	Atria	107 13.0 S69 04.2					
	20	9 25.9	165 07.5 48.8	126 52.1 17.4	334 12.5 37.7	35 39.6 38.9	Avior	234 14.7 S59 34.8					
	21	24 28.3	180 07.2 . 49.8	141 52.7 . 17.8	349 15.2 . 37.6	50 42.0 . 38.9	Bellatrix	278 23.6 N 6 22.3					
	22	39 30.8	195 06.9 50.8	156 53.3 18.1	4 17.9 37.5	65 44.3 38.8	Betelgeuse	270 52.8 N 7 24.7					
	23	54 33.3	210 06.6 51.9	171 53.8 18.5	19 20.6 37.5	80 46.7 38.8							
F R I D A Y	100	69 35.7	225 06.3 S 7 52.9	186 54.4 S21 18.8	34 23.3 N12 37.4	95 49.1 S12 38.7	Canopus	263 52.3 S52 42.3					
	01	84 38.2	240 06.0 53.9	201 55.0 19.2	49 26.0 37.3	110 51.4 38.7	Capella	280 22.8 N46 01.3					
	02	99 40.7	255 05.7 54.9	216 55.6 19.5	64 28.7 37.3	125 53.8 38.6	Deneb	49 26.7 N45 22.1					
	03	114 43.1	270 05.4 . 55.9	231 56.2 . 19.9	79 31.4 . 37.2	140 56.1 . 38.6	Denebola	182 26.0 N14 26.3					
	04	129 45.6	285 05.1 56.9	246 56.7 20.2	94 34.1 37.1	155 58.5 38.6	Diphda	348 48.1 S17 51.4					
	05	144 48.1	300 04.8 57.9	261 57.3 20.6	109 36.8 37.1	171 00.8 38.5							
	06	159 50.5	315 04.5 S 7 58.9	276 57.9 S21 20.9	124 39.5 N12 37.0	186 03.2 S12 38.5	Dubhe	193 42.2 N61 37.1					
	07	174 53.0	330 04.2 7 59.9	291 58.5 21.3	139 42.2 36.9	201 05.5 38.4	Elath	278 02.7 N28 37.7					
	08	189 55.5	345 03.9 8 00.9	306 59.0 21.6	154 44.9 36.9	216 07.9 38.4	Eltanin	90 43.1 N51 29.2					
	09	204 57.9	0 03.6 . 01.9	321 59.6 . 22.0	169 47.6 . 36.8	231 10.3 . 38.3	Enif	33 39.8 N 9 59.1					
	10	220 00.4	15 03.3 02.9	337 00.2 22.3	184 50.3 36.7	246 12.6 38.3	Fomalhaut	15 15.5 S29 29.9					
	11	235 02.8	30 03.0 03.9	352 00.8 22.7	199 53.0 36.7	261 15.0 38.2							
	12	250 05.3	45 02.7 S 8 04.9	7 01.3 S21 23.0	214 55.7 N12 36.6	276 17.3 S12 38.2	Gacrux	171 53.0 S57 14.5					
	13	265 07.8	60 02.4 05.9	22 01.9 23.4	229 58.4 36.5	291 19.7 38.1	Gienah	175 44.7 S17 40.3					
	14	280 10.2	75 02.1 07.0	37 02.5 23.7	245 01.1 36.4	306 22.0 38.1	Hadar	148 37.9 S60 29.0					
	15	295 12.7	90 01.8 . 08.0	52 03.1 . 24.1	260 03.8 . 36.4	321 24.4 . 38.1	Hamal	327 52.0 N23 34.6					
	16	310 15.2	105 01.5 09.0	67 03.6 24.4	275 06.5 36.3	336 26.7 38.0	Kaus Aust.	83 34.1 S34 22.4					
	17	325 17.6	120 01.2 10.0	82 04.2 24.8	290 09.2 36.2	351 29.1 38.0							
	18	340 20.1	135 00.9 S 8 11.0	97 04.8 S21 25.1	305 11.9 N12 36.2	6 31.5 S12 37.9	Kochab	137 20.8 N74 03.3					
	19	355 22.6	150 00.6 12.0	112 05.4 25.5	320 14.6 36.1	21 33.8 37.9	Markab	13 30.8 N15 20.1					
	20	10 25.0	165 00.3 13.0	127 05.9 25.8	335 17.3 36.0	36 36.2 37.8	Menkar	314 06.8 N 4 11.0					
	21	25 27.5	180 00.0 . 14.0	142 06.5 . 26.2	350 20.0 . 36.0	51 38.5 . 37.8	Menkent	147 59.1 S36 29.1					
	22	40 30.0	194 59.7 15.0	157 07.1 26.5	5 22.7 35.9	66 40.9 37.7	Miaplacidus	221 38.1 S69 48.5					
	23	55 32.4	209 59.4 16.0	172 07.6 26.8	20 25.4 35.8	81 43.2 37.7							
S A T U R D A Y	200	70 34.9	224 59.0 S 8 17.0	187 08.2 S21 27.2	35 28.1 N12 35.8	96 45.6 S12 37.6	Mirfak	308 29.1 N49 56.8					
	01	85 37.3	239 58.7 18.0	202 08.8 27.5	50 30.7 35.7	111 47.9 37.6	Nunki	75 49.2 S26 16.1					
	02	100 39.8	254 58.4 19.0	217 09.4 27.9	65 33.4 35.6	126 50.3 37.5	Peacock	53 07.5 S56 39.7					
	03	115 42.3	269 58.1 . 20.0	232 09.9 . 28.2	80 36.1 . 35.6	141 52.6 . 37.5	Pollux	243 18.2 N27 58.1					
	04	130 44.7	284 57.8 21.0	247 10.5 28.6	95 38.8 35.5	156 55.0 37.5	Procyon	244 51.6 N 5 09.9					
	05	145 47.2	299 57.5 22.0	262 11.1 28.9	110 41.5 35.4	171 57.3 37.4							
	06	160 49.7	314 57.2 S 8 23.0	277 11.6 S21 29.2	125 44.2 N12 35.4	186 59.7 S12 37.4	Rasalhague	95 59.8 N12 32.6					
	07	175 52.1	329 56.9 24.0	292 12.2 29.6	140 46.9 35.3	202 02.0 37.3	Regulus	207 35.4 N11 51.0					
	08	190 54.6	344 56.6 25.0	307 12.8 29.9	155 49.6 35.2	217 04.4 37.3	Rigel	281 04.4 S 8 10.4					
	09	205 57.1	359 56.3 . 26.0	322 13.4 . 30.3	170 52.3 . 35.2	232 06.8 . 37.2	Rigil Kent.	139 42.2 S60 55.8					
	10	220 59.5	14 56.0 27.0	337 13.9 30.6	185 55.0 35.1	247 09.1 37.2	Sabik	102 04.2 S15 45.2					
	11	236 02.0	29 55.7 28.0	352 14.5 30.9	200 57.7 35.0	262 11.5 37.1							
	12	251 04.5	44 55.3 S 8 29.0	7 15.1 S21 31.3	216 00.4 N12 35.0	277 13.8 S12 37.1	Schedar	349 31.8 N56 40.3					
	13	266 06.9	59 55.0 30.0	22 15.6 31.6	231 03.1 34.9	292 16.2 37.0	Shaula	96 12.1 S37 07.3					
	14	281 09.4	74 54.7 31.1	37 16.2 32.0	246 05.8 34.8	307 18.5 37.0	Sirius	258 26.8 S16 44.8					
	15	296 11.8	89 54.4 . 32.1	52 16.8 . 32.3	261 08.5 . 34.8	322 20.9 . 36.9	Spica	158 23.5 S11 17.0					
	16	311 14.3	104 54.1 33.1	67 17.3 32.6	276 11.1 34.7	337 23.2 36.9	Suhail	222 46.8 S43 31.4					
	17	326 16.8	119 53.8 34.1	82 17.9 33.0	291 13.8 34.7	352 25.6 36.8							
	18	341 19.2	134 53.5 S 8 35.1	97 18.5 S21 33.3	306 16.5 N12 34.6	7 27.9 S12 36.8	Vega	80 34.2 N38 48.4					
	19	356 21.7	149 53.1 36.1	112 19.0 33.7	321 19.2 34.5	22 30.3 36.8	Zuben'ubi	136 57.4 S16 08.4					
	20	11 24.2	164 52.8 37.1	127 19.6 34.0	336 21.9 34.5	37 32.6 36.7							
	21	26 26.6	179 52.5 . 38.1	142 20.2 . 34.3	351 24.6 . 34.4	52 35.0 . 36.7							
	22	41 29.1	194 52.2 39.1	157 20.7 34.7	6 27.3 34.3	67 37.3 36.6	Venus	155 30.5 S 9 00					
	23	56 31.6	209 51.9 40.1	172 21.3 35.0	21 30.0 34.3	82 39.7 36.6	Mars	117 18.7 S 11 32					
							Jupiter	324 47.5 S 21 39					
							Saturn	26 13.3 S 17 34					
Mer. Pass. 19 18.4		v -0.3 d 1.0	v 0.6 d 0.3	v 2.7 d 0.1	v 2.4 d 0.0								

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	30		1	2	3						
d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m		
30	00	182	54.4	S21	33.6	328	15.5	7.6	N28	04.6	1.6	56.0	N 72	07 50	09 49				18 22		
	01	197	54.2		34.0	342	42.1	7.6	28	03.0	1.8	55.9	N 70	07 34	09 10				19 22		
	02	212	54.0		34.4	357	08.7	7.6	28	01.2	1.9	55.9	68	07 21	08 43				19 56		
	03	227	53.8		34.8	372	35.3	7.8	27	59.3	2.1	55.9	66	07 10	08 22	09 46			18 18	20 21	
	04	242	53.6		35.3	387	02.1	7.8	27	57.2	2.2	55.9	64	07 01	08 06	09 15		16 44	18 53	20 40	
THURSDAY	05	257	53.3		35.7	402	28.9	7.8	27	55.0	2.4	55.8	62	06 52	07 52	08 52	15 39	17 33	19 18	20 55	
	06	272	53.1	S21	36.1	417	55.7	7.9	N27	52.6	2.6	55.8	60	06 45	07 40	08 34	16 32	18 04	19 38	21 08	
	07	287	52.9		36.5	432	22.6	8.0	27	50.0	2.6	55.8	N 58	06 39	07 30	08 19	17 04	18 27	19 54	21 19	
	08	302	52.7		36.9	447	49.6	8.0	27	47.4	2.9	55.8	56	06 33	07 21	08 06	17 28	18 46	20 08	21 28	
	09	317	52.4		37.3	462	76.5	8.1	27	44.5	3.0	55.7	54	06 28	07 13	07 55	17 47	19 02	20 20	21 37	
	10	332	52.2		37.7	477	103.6	8.2	27	41.5	3.1	55.7	52	06 23	07 05	07 45	18 03	19 15	20 30	21 44	
	11	347	52.0		38.1	492	130.7	8.3	27	38.4	3.3	55.7	50	06 18	06 59	07 36	18 17	19 27	20 39	21 51	
	12	2	51.8	S21	38.5	507	157.8	8.3	N27	35.1	3.4	55.7	45	06 08	06 44	07 17	18 45	19 52	20 59	22 05	
	13	17	51.5		38.9	522	184.9	8.4	27	31.7	3.5	55.6	N 40	05 59	06 32	07 02	19 08	20 11	21 15	22 17	
	14	32	51.3		39.3	537	212.0	8.4	27	28.2	3.8	55.6	35	05 50	06 22	06 49	19 26	20 27	21 28	22 27	
	15	47	51.1		39.7	552	239.1	8.5	27	24.4	3.8	55.6	30	05 42	06 12	06 38	19 42	20 41	21 39	22 36	
	16	62	50.9		40.1	567	266.2	8.6	27	20.6	4.0	55.6	N 20	05 27	05 55	06 18	20 09	21 05	21 59	22 51	
	17	77	50.6		40.5	582	293.3	8.7	27	16.6	4.1	55.5	0	05 13	05 39	06 01	20 32	21 25	22 16	23 04	
	18	92	50.4	S21	40.9	597	320.4	8.8	N27	12.5	4.3	55.5	S 10	04 40	05 06	05 29	21 14	22 03	22 48	23 28	
	19	107	50.2		41.3	612	347.5	8.8	27	08.2	4.4	55.5	20	04 19	04 47	05 12	21 37	22 24	23 05	23 41	
	20	122	50.0		41.7	627	374.6	8.9	27	03.8	4.5	55.5	30	03 52	04 24	04 51	22 04	22 47	23 24	23 56	
	21	137	49.7		42.1	642	401.7	9.0	26	59.3	4.7	55.4	35	03 35	04 10	04 39	22 20	23 01	23 35	24 04	
	22	152	49.5		42.5	657	428.8	9.1	26	54.6	4.8	55.4	40	03 13	03 54	04 26	22 38	23 16	23 48	24 14	
	23	167	49.3		42.9	672	455.9	9.2	26	49.8	5.0	55.4	45	02 46	03 33	04 09	22 59	23 35	24 03	00 03	
	1	00	182	49.1	S21	43.3	315	10.9	9.2	N26	44.8	5.1	55.4	S 50	02 07	03 06	03 49	23 27	23 58	24 21	00 21
		01	197	48.8		43.7	329	39.1	9.3	26	39.7	5.2	55.4	52	01 45	02 53	03 39	23 40	24 10	00 10	00 30
		02	212	48.6		44.1	344	07.4	9.4	26	34.5	5.3	55.3	54	01 15	02 38	03 28	23 56	24 22	00 22	00 40
		03	227	48.4		44.5	358	35.8	9.5	26	29.2	5.5	55.3	56	00 20	02 19	03 16	24 14	00 14	00 37	00 50
		04	242	48.1		44.9	373	04.3	9.6	26	23.7	5.6	55.3	58	////	01 56	03 01	00 03	00 36	00 53	01 03
FRIDAY	05	257	47.9		45.3	387	32.9	9.6	26	18.1	5.7	55.3	S 60	////	01 24	02 44	00 41	01 05	01 14	01 17	
	06	272	47.7	S21	45.7	402	61.5	9.8	N26	12.4	5.9	55.2		Lat.	Sunset	Twilight		Moonset			
	07	287	47.4		46.1	417	90.3	9.8	26	06.5	6.0	55.2				Civil	Naut.	30	1	2	3
	08	302	47.2		46.5	432	119.1	9.9	26	00.5	6.1	55.2									
	09	317	47.0		46.9	447	148.0	10.0	25	54.4	6.2	55.2									
	10	332	46.8		47.3	462	176.9	10.1	25	48.2	6.4	55.2									
	11	347	46.5		47.7	477	205.8	10.2	25	41.8	6.4	55.1	N 72		13 48	15 47				16 09	
	12	2	46.3	S21	48.1	492	234.9	10.3	N25	35.4	6.6	55.1	N 70		14 27	16 03				15 07	
	13	17	46.1		48.4	507	263.8	10.3	25	28.8	6.7	55.1	68	13 03	14 54	16 16			15 44	14 32	
	14	32	45.8		48.8	522	292.7	10.5	25	22.1	6.9	55.1	66	13 51	15 15	16 27			14 36	14 06	
	15	47	45.6		49.2	537	321.6	10.5	25	15.2	6.9	55.1	64	14 22	15 32	16 37		14 29	14 00	13 46	
	16	62	45.4		49.6	552	350.5	10.7	25	08.3	7.1	55.0	62	14 45	15 45	16 45	13 45	13 39	13 34	13 30	
	17	77	45.1		50.0	567	379.4	10.7	25	01.2	7.2	55.0	60	15 03	15 57	16 52	12 51	13 07	13 14	13 16	
	18	92	44.9	S21	50.4	582	408.3	10.8	N24	54.0	7.2	55.0	N 58	15 18	16 07	16 59	12 19	12 44	12 57	13 04	
	19	107	44.7		50.8	597	437.2	10.9	24	46.8	7.4	55.0	56	15 31	16 17	17 04	11 55	12 24	12 42	12 54	
	20	122	44.4		51.1	612	466.1	11.0	24	39.4	7.6	55.0	54	15 42	16 25	17 10	11 36	12 08	12 30	12 45	
	21	137	44.2		51.5	627	495.0	11.0	24	31.8	7.6	54.9	52	15 52	16 32	17 15	11 19	11 54	12 19	12 36	
	22	152	44.0		51.9	642	523.9	11.2	24	24.2	7.7	54.9	50	16 01	16 39	17 19	11 05	11 42	12 09	12 29	
	23	167	43.7		52.3	657	552.8	11.3	24	16.5	7.8	54.9	45	16 20	16 53	17 30	10 36	11 17	11 49	12 13	
	2	00	182	43.5	S21	52.7	302	52.5	11.3	N24	08.7	8.0	54.9	N 40	16 35	17 05	17 39	10 13	10 57	11 32	12 00
		01	197	43.3		53.0	317	22.8	11.5	24	00.7	8.0	54.9	35	16 48	17 16	17 47	09 55	10 40	11 18	11 49
		02	212	43.0		53.4	331	53.3	11.5	23	52.7	8.2	54.8	30	17 00	17 26	17 55	09 38	10 25	11 05	11 39
		03	227	42.8		53.8	346	23.8	11.6	23	44.5	8.3	54.8	20	17 19	17 43	18 10	09 11	10 00	10 44	11 22
		04	242	42.5		54.2	361	54.4	11.7	23	36.2	8.3	54.8	N 10	17 36	17 59	18 25	08 47	09 39	10 25	11 08
SATURDAY	05	257	42.3		54.6	376	25.1	11.8	23	27.9	8.5	54.8	0	17 53	18 15	18 41	08 25	09 18	10 08	10 54	
	06	272	42.1	S21	54.9	391	55.9	11.9	N23	19.4	8.5	54.8	S 10	18 09	18 32	18 58	08 03	08 58	09 50	10 40	
	07	287	41.8		55.3	406	26.8	12.0	23	10.9	8.7	54.8	20	18 26	18 51	19 19	07 39	08 36	09 31	10 24	
	08	302	41.6		55.7	421	57.8	12.1	23	02.2	8.7	54.7	30	18 47	19 14	19 46	07 11	08 10	09 10	10 07	
	09	317	41.4		56.1	436	28.9	12.2	22	53.5	8.9	54.7	35	18 59	19 28	20 04	06 55	07 55	08 57	09 57	
	10	332	41.1		56.4	451	00.1	12.2	22	44.6	9.0	54.7	40	19 13	19 45	20 25	06 36	07 38	08 42	09 45	
	11	347	40.9		56.8	466	31.3	12.3	22	35.6	9.0	54.7	45	19 29	20 05	20 53	06 12	07 17	08 24	09 31	
	12	2	40.6	S21	57.2	481	02.6	12.5	N22	26.6	9.1	54.7	S 50	19 50	20 32	21 32	05 42	06 50	08 02	09 14	
	13	17	40.4		57.5	496	34.1	12.5	22	17.5	9.3	54.7	52	19 59	20 46	21 54	05 27	06 37	07 51	09 06	
	14	32	40.2		57.9	511	05.6	12.6	22	08.2	9.3	54.6	54	20 10	21 01	22 25	05 10	06 21	07 39	08 57	
	15	47	39.9		58.3	526	37.2	12.7	21	58.9	9.4	54.6	56	20 23	21 20	23 28	04 49	06 03	07 25	08 47	
	16	62	39.7																		



UT	ARIES		VENUS −4.2		MARS +1.4		JUPITER −2.8		SATURN +0.8		STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
SUNDAY	300	71 34.0	224 51.6	S 8 41.1	187 21.9	S21 35.3	36 32.7	N12 34.2	97 42.0	S12 36.5	Acamar	315 12.1	S40 12.6
	01	86 36.5	239 51.3	42.1	202 22.4	35.7	51 35.4	34.1	112 44.4	36.5	Achernar	335 20.5	S57 07.1
	02	101 39.0	254 50.9	43.1	217 23.0	36.0	66 38.1	34.1	127 46.7	36.4	Acrux	173 01.4	S63 13.6
	03	116 41.4	269 50.6	. . 44.1	232 23.6	. . 36.3	81 40.7	. . 34.0	142 49.1	. . 36.4	Adhara	255 06.3	S29 00.1
	04	131 43.9	284 50.3	45.1	247 24.1	36.7	96 43.4	33.9	157 51.4	36.3	Aldebaran	290 40.3	N16 33.5
	05	146 46.3	299 50.0	46.1	262 24.7	37.0	111 46.1	33.9	172 53.8	36.3			
	06	161 48.8	314 49.7	S 8 47.1	277 25.3	S21 37.3	126 48.8	N12 33.8	187 56.1	S12 36.2	Alioth	166 14.1	N55 49.6
	07	176 51.3	329 49.3	48.1	292 25.8	37.7	141 51.5	33.7	202 58.5	36.2	Alkaid	152 53.1	N49 11.5
	08	191 53.7	344 49.0	49.1	307 26.4	38.0	156 54.2	33.7	218 00.8	36.1	Alnair	27 34.2	S46 51.0
	09	206 56.2	359 48.7	. . 50.1	322 27.0	. . 38.3	171 56.9	. . 33.6	233 03.2	. . 36.1	Alnilam	275 38.3	S 1 11.1
	10	221 58.7	14 48.4	51.1	337 27.5	38.7	186 59.6	33.6	248 05.5	36.0	Alphard	217 48.5	S 8 45.6
	11	237 01.1	29 48.1	52.1	352 28.1	39.0	202 02.2	33.5	263 07.8	36.0			
	12	252 03.6	44 47.7	S 8 53.1	7 28.6	S21 39.3	217 04.9	N12 33.4	278 10.2	S12 35.9	Alphecca	126 04.9	N26 38.0
	13	267 06.1	59 47.4	54.1	22 29.2	39.7	232 07.6	33.4	293 12.5	35.9	Alpheratz	357 35.6	N29 13.5
	14	282 08.5	74 47.1	55.1	37 29.8	40.0	247 10.3	33.3	308 14.9	35.8	Altair	62 01.1	N 8 55.9
	15	297 11.0	89 46.8	. . 56.1	52 30.3	. . 40.3	262 13.0	. . 33.2	323 17.2	. . 35.8	Ankaa	353 07.9	S42 10.8
	16	312 13.4	104 46.4	57.1	67 30.9	40.7	277 15.7	33.2	338 19.6	35.7	Antares	112 17.4	S26 29.0
	17	327 15.9	119 46.1	58.1	82 31.5	41.0	292 18.4	33.1	353 21.9	35.7			
	18	342 18.4	134 45.8	S 8 59.1	97 32.0	S21 41.3	307 21.0	N12 33.0	8 24.3	S12 35.6	Arcturus	145 49.0	N19 03.5
	19	357 20.8	149 45.5	9 00.1	112 32.6	41.7	322 23.7	33.0	23 26.6	35.6	Atria	107 13.0	S69 04.2
	20	12 23.3	164 45.1	01.1	127 33.1	42.0	337 26.4	32.9	38 29.0	35.5	Avior	234 14.7	S59 34.8
	21	27 25.8	179 44.8	. . 02.1	142 33.7	. . 42.3	352 29.1	. . 32.9	53 31.3	. . 35.5	Bellatrix	278 23.5	N 6 22.3
	22	42 28.2	194 44.5	03.1	157 34.3	42.6	7 31.8	32.8	68 33.7	35.5	Betelgeuse	270 52.8	N 7 24.7
	23	57 30.7	209 44.2	04.1	172 34.8	43.0	22 34.5	32.7	83 36.0	35.4			
MONDAY	400	72 33.2	224 43.8	S 9 05.1	187 35.4	S21 43.3	37 37.1	N12 32.7	98 38.4	S12 35.4	Canopus	263 52.3	S52 42.3
	01	87 35.6	239 43.5	06.1	202 35.9	43.6	52 39.8	32.6	113 40.7	35.3	Capella	280 22.8	N46 01.3
	02	102 38.1	254 43.2	07.0	217 36.5	44.0	67 42.5	32.5	128 43.0	35.3	Deneb	49 26.7	N45 22.1
	03	117 40.6	269 42.8	. . 08.0	232 37.1	. . 44.3	82 45.2	. . 32.5	143 45.4	. . 35.2	Denebola	182 26.0	N14 26.3
	04	132 43.0	284 42.5	09.0	247 37.6	44.6	97 47.9	32.4	158 47.7	35.2	Diphda	348 48.1	S17 51.4
	05	147 45.5	299 42.2	10.0	262 38.2	44.9	112 50.5	32.4	173 50.1	35.1			
	06	162 47.9	314 41.9	S 9 11.0	277 38.7	S21 45.3	127 53.2	N12 32.3	188 52.4	S12 35.1	Dubhe	193 42.2	N61 37.1
	07	177 50.4	329 41.5	12.0	292 39.3	45.6	142 55.9	32.2	203 54.8	35.0	Elnath	278 02.7	N28 37.7
	08	192 52.9	344 41.2	13.0	307 39.9	45.9	157 58.6	32.2	218 57.1	35.0	Eltanin	90 43.1	N51 29.2
	09	207 55.3	359 40.9	. . 14.0	322 40.4	. . 46.2	173 01.3	. . 32.1	233 59.5	. . 34.9	Enif	33 39.8	N 9 59.1
	10	222 57.8	14 40.5	15.0	337 41.0	46.6	188 04.0	32.1	249 01.8	34.9	Fomalhaut	15 15.5	S29 29.9
	11	238 00.3	29 40.2	16.0	352 41.5	46.9	203 06.6	32.0	264 04.2	34.8			
	12	253 02.7	44 39.9	S 9 17.0	7 42.1	S21 47.2	218 09.3	N12 31.9	279 06.5	S12 34.8	Gacrux	171 53.0	S57 14.5
	13	268 05.2	59 39.5	18.0	22 42.6	47.5	233 12.0	31.9	294 08.8	34.7	Gienah	175 44.7	S17 40.3
	14	283 07.7	74 39.2	19.0	37 43.2	47.8	248 14.7	31.8	309 11.2	34.7	Hadar	148 37.9	S60 29.0
	15	298 10.1	89 38.9	. . 20.0	52 43.8	. . 48.2	263 17.3	. . 31.7	324 13.5	. . 34.6	Hamal	327 52.0	N23 34.6
	16	313 12.6	104 38.5	21.0	67 44.3	48.5	278 20.0	31.7	339 15.9	34.6	Kaus Aust.	83 34.1	S34 22.4
	17	328 15.1	119 38.2	22.0	82 44.9	48.8	293 22.7	31.6	354 18.2	34.5			
	18	343 17.5	134 37.9	S 9 23.0	97 45.4	S21 49.1	308 25.4	N12 31.6	9 20.6	S12 34.5	Kochab	137 20.8	N74 03.2
	19	358 20.0	149 37.5	24.0	112 46.0	49.5	323 28.1	31.5	24 22.9	34.4	Markab	13 30.8	N15 20.1
	20	13 22.4	164 37.2	25.0	127 46.5	49.8	338 30.7	31.4	39 25.2	34.4	Menkar	314 06.8	N 4 11.0
	21	28 24.9	179 36.9	. . 26.0	142 47.1	. . 50.1	353 33.4	. . 31.4	54 27.6	. . 34.3	Menkent	147 59.0	S36 29.1
	22	43 27.4	194 36.5	27.0	157 47.6	50.4	8 36.1	31.3	69 29.9	34.3	Miaplacidus	221 38.1	S69 48.5
	23	58 29.8	209 36.2	27.9	172 48.2	50.7	23 38.8	31.3	84 32.3	34.2			
TUESDAY	500	73 32.3	224 35.8	S 9 28.9	187 48.8	S21 51.1	38 41.4	N12 31.2	99 34.6	S12 34.2	Mirfak	308 29.1	N49 56.9
	01	88 34.8	239 35.5	29.9	202 49.3	51.4	53 44.1	31.1	114 37.0	34.1	Nunki	75 49.2	S26 16.1
	02	103 37.2	254 35.2	30.9	217 49.9	51.7	68 46.8	31.1	129 39.3	34.1	Peacock	53 07.5	S56 39.7
	03	118 39.7	269 34.8	. . 31.9	232 50.4	. . 52.0	83 49.5	. . 31.0	144 41.6	. . 34.0	Pollux	243 18.2	N27 58.1
	04	133 42.2	284 34.5	32.9	247 51.0	52.3	98 52.1	31.0	159 44.0	34.0	Procyon	244 51.6	N 5 09.9
	05	148 44.6	299 34.1	33.9	262 51.5	52.7	113 54.8	30.9	174 46.3	33.9			
	06	163 47.1	314 33.8	S 9 34.9	277 52.1	S21 53.0	128 57.5	N12 30.8	189 48.7	S12 33.9	Rasalhague	95 59.8	N12 32.6
	07	178 49.5	329 33.5	35.9	292 52.6	53.3	144 00.2	30.8	204 51.0	33.8	Regulus	207 35.4	N11 51.0
	08	193 52.0	344 33.1	36.9	307 53.2	53.6	159 02.8	30.7	219 53.3	33.8	Rigel	281 04.4	S 8 10.4
	09	208 54.5	359 32.8	. . 37.9	322 53.7	. . 53.9	174 05.5	. . 30.7	234 55.7	. . 33.7	Rigel Kent.	139 42.2	S60 55.8
	10	223 56.9	14 32.4	38.9	337 54.3	54.2	189 08.2	30.6	249 58.0	33.7	Sabik	102 04.2	S15 45.2
	11	238 59.4	29 32.1	39.8	352 54.8	54.5	204 10.9	30.6	265 00.4	33.6			
	12	254 01.9	44 31.7	S 9 40.8	7 55.4	S21 54.9	219 13.5	N12 30.5	280 02.7	S12 33.5	Schedar	349 31.8	N56 40.3
	13	269 04.3	59 31.4	41.8	22 55.9	55.2	234 16.2	30.4	295 05.0	33.5	Shaula	96 12.1	S37 07.3
	14	284 06.8	74 31.1	42.8	37 56.5	55.5	249 18.9	30.4	310 07.4	33.4	Sirius	258 26.7	S16 44.8
	15	299 09.3	89 30.7	. . 43.8	52 57.0	. . 55.8	264 21.5	. . 30.3	325 09.7	. . 33.4	Spica	158 23.5	S11 17.0
	16	314 11.7	104 30.4	44.8	67 57.6	56.1	279 24.2	30.3	340 12.1	33.3	Suhail	222 46.8	S43 31.4
	17	329 14.2	119 30.0	45.8	82 58.1	56.4	294 26.9	30.2	355 14.4	33.3			
	18	344 16.7	134 29.7	S 9 46.8	97 58.7	S21 56.7	309 29.6	N12 30.1	10 16.7	S12 33.2	Vega	80 34.2	N38 48.4
	19	359 19.1	149 29.3	47.8	112 59.2	57.1	324 32.2	30.1	25 19.1	33.2	Zuben'ubi	136 57.4	S16 08.4
	20	14 21.6	164 29.0	48.8	127 59.8	57.4	339 34.9	30.0	40 21.4	33.1			
	21	29 24.0	179 28.6	. . 49.7	143 00.3	. . 57.7	354 37.6	. . 30.0	55 23.8	. . 33.1			
	22	44 26.5	194 28.3	50.7	158 00.9	58.0	9 40.2	29.9	70 26.1	33.0	Venus	152 10.7	h m 9 01
	23	59 29.0	209 27.9	51.7	173 01.4	58.3	24 42.9	29.9	85 28.4	33.0	Mars	115 02.2	h m 11 29
		h m	d							Jupiter	325 04.0	21 26	
Mer. Pass. 19 06.6		γ −0.3	d 1.0	γ 0.6	d 0.3	γ 2.7	d 0.1	γ 2.3	d 0.0	Saturn	26 05.2	17 23	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	3	4	5	6			
d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m	h m				
SUNDAY	300	182	37.8	S22	01.6	291	25.5	13.4	N20	31.1	10.2	54.5	N 72	07 58	10 03		18 22	21 15	23 22	25 20	
	01	197	37.5		01.9	305	57.9	13.5	20	20.9	10.2	54.5	N 70	07 41	09 20		19 22	21 37	23 31	25 19	
	02	212	37.3		02.3	320	30.4	13.6	20	10.7	10.4	54.5	68	07 27	08 51	10 53	19 56	21 53	23 38	25 19	
	03	227	37.0		02.7	335	03.0	13.7	20	00.3	10.4	54.5	66	07 16	08 29	09 56	20 21	22 06	23 44	25 19	
	04	242	36.8		03.0	349	35.7	13.8	19	49.9	10.5	54.5	64	07 06	08 12	09 23	20 40	22 17	23 48	25 19	
	05	257	36.5		03.4	4	08.5	13.9	19	39.4	10.5	54.4	62	06 57	07 57	08 59	20 55	22 26	23 53	25 19	
	06	272	36.3	S22	03.7	18	41.4	13.9	N19	28.9	10.7	54.4	60	06 50	07 45	08 40	21 08	22 34	23 56	25 18	
	07	287	36.1		04.1	33	14.3	14.0	19	18.2	10.7	54.4	N 58	06 43	07 35	08 24	21 19	22 40	24 00	00 00	
	08	302	35.8		04.5	47	47.3	14.1	19	07.5	10.8	54.4	56	06 37	07 25	08 11	21 28	22 46	24 02	00 02	
	09	317	35.6		04.8	62	20.4	14.1	18	56.7	10.9	54.4	54	06 31	07 17	07 59	21 37	22 52	24 05	00 05	
	10	332	35.3		05.2	76	53.5	14.3	18	45.8	10.9	54.4	52	06 26	07 09	07 49	21 44	22 57	24 07	00 07	
	11	347	35.1		05.5	91	26.8	14.3	18	34.9	11.0	54.4	50	06 21	07 02	07 40	21 51	23 01	24 09	00 09	
	12	2	34.8	S22	05.9	106	00.1	14.4	N18	23.9	11.1	54.4	45	06 11	06 48	07 21	22 05	23 10	24 14	00 14	
	13	17	34.6		06.2	120	33.5	14.4	18	12.8	11.1	54.4	N 40	06 01	06 35	07 05	22 17	23 18	24 18	00 18	
	14	32	34.3		06.6	135	06.9	14.6	18	01.7	11.2	54.4	35	05 53	06 24	06 52	22 27	23 25	24 21	00 21	
	15	47	34.1		06.9	149	40.5	14.6	17	50.5	11.3	54.3	30	05 45	06 14	06 40	22 36	23 31	24 24	00 24	
	16	62	33.9		07.3	164	14.1	14.6	17	39.2	11.3	54.3	20	05 29	05 56	06 20	22 51	23 41	24 29	00 29	
	17	77	33.6		07.6	178	47.7	14.8	17	27.9	11.5	54.3	N 10	05 14	05 40	06 03	23 04	23 49	24 33	00 33	
	18	92	33.4	S22	08.0	193	21.5	14.8	N17	16.4	11.4	54.3	0	04 58	05 24	05 46	23 16	23 58	24 37	00 37	
	19	107	33.1		08.3	207	55.3	14.8	17	05.0	11.6	54.3	S 10	04 40	05 07	05 30	23 28	24 06	00 06	00 41	
	20	122	32.9		08.7	222	29.1	15.0	16	53.4	11.6	54.3	20	04 19	04 48	05 12	23 41	24 14	00 14	00 46	
	21	137	32.6		09.0	237	03.1	15.0	16	41.8	11.6	54.3	30	03 51	04 24	04 51	23 56	24 24	00 24	00 51	
	22	152	32.4		09.4	251	37.1	15.1	16	30.2	11.7	54.3	35	03 34	04 10	04 39	24 04	00 04	00 30	00 54	
	23	167	32.1		09.7	266	11.2	15.1	16	18.5	11.8	54.3	40	03 12	03 53	04 25	24 14	00 14	00 36	00 57	
MONDAY	400	182	31.9	S22	10.1	280	45.3	15.2	N16	06.7	11.9	54.3	S 50	02 03	03 04	03 47	00 21	00 39	00 53	01 05	
	01	197	31.6		10.4	295	19.5	15.3	15	54.8	11.9	54.3	52	01 40	02 51	03 37	00 30	00 45	00 57	01 07	
	02	212	31.4		10.7	309	53.8	15.3	15	42.9	11.9	54.3	54	01 08	02 34	03 26	00 40	00 52	01 01	01 09	
	03	227	31.1		11.1	324	28.1	15.4	15	31.0	12.0	54.3	56	////	02 15	03 13	00 50	00 59	01 06	01 11	
	04	242	30.9		11.4	339	02.5	15.4	15	19.0	12.1	54.3	58	////	01 50	02 58	01 03	01 08	01 12	01 14	
	05	257	30.6		11.8	353	36.9	15.5	15	06.9	12.1	54.3	S 60	////	01 15	02 40	01 17	01 18	01 18	01 17	
	06	272	30.4	S22	12.1	8	11.4	15.6	N14	54.8	12.2	54.3		Lat.	Sunset	Twilight		Moonset			
	07	287	30.1		12.5	22	46.0	15.6	14	42.6	12.2	54.3				Civil	Naut.	3	4	5	6
	08	302	29.9		12.8	37	20.6	15.7	14	30.4	12.3	54.2									
	09	317	29.6		13.1	51	55.3	15.7	14	18.1	12.4	54.2									
	10	332	29.4		13.5	66	30.0	15.8	14	05.7	12.4	54.2									
	11	347	29.1		13.8	81	04.8	15.8	13	53.3	12.4	54.2									
	12	2	28.9	S22	14.1	95	39.6	15.9	N13	40.9	12.5	54.2	N 72		13 37	15 41	16 09	14 43	14 02	13 29	
	13	17	28.6		14.5	110	14.5	16.0	13	28.4	12.5	54.2	N 70		14 20	15 59	15 07	14 20	13 50	13 50	
	14	32	28.4		14.8	124	49.5	15.9	13	15.9	12.6	54.2	68	12 46	14 49	16 12	14 32	14 02	13 41	13 23	
	15	47	28.1		15.1	139	24.4	16.1	13	03.3	12.6	54.2	66	13 44	15 11	16 24	14 06	13 48	13 33	13 20	
	16	62	27.9		15.5	153	59.5	16.1	12	50.7	12.7	54.2	64	14 16	15 28	16 34	13 46	13 36	13 27	13 18	
	17	77	27.6		15.8	168	34.6	16.1	12	38.0	12.7	54.2	62	14 41	15 42	16 42	13 30	13 25	13 21	13 17	
	18	92	27.4	S22	16.1	183	09.7	16.2	N12	25.3	12.8	54.2	60	15 00	15 55	16 50	13 16	13 16	13 16	13 15	
	19	107	27.1		16.5	197	44.9	16.2	12	12.5	12.8	54.2	N 58	15 15	16 05	16 57	13 04	13 08	13 11	13 14	
	20	122	26.9		16.8	212	20.1	16.2	11	59.7	12.9	54.2	56	15 29	16 15	17 03	12 54	13 02	13 07	13 12	
	21	137	26.6		17.1	226	55.3	16.3	11	46.8	12.9	54.2	54	15 40	16 23	17 08	12 45	12 55	13 04	13 11	
	22	152	26.4		17.5	241	30.6	16.4	11	33.9	12.9	54.2	52	15 51	16 31	17 14	12 36	12 50	13 01	13 10	
	23	167	26.1		17.8	256	06.0	16.4	11	21.0	13.0	54.2	50	16 00	16 37	17 18	12 29	12 45	12 58	13 09	
TUESDAY	500	182	25.8	S22	18.1	270	41.4	16.4	N11	08.0	13.1	54.2	45	16 19	16 52	17 29	12 13	12 34	12 51	13 07	
	01	197	25.6		18.4	285	16.8	16.4	10	54.9	13.0	54.2	N 40	16 35	17 05	17 39	12 00	12 24	12 46	13 06	
	02	212	25.3		18.8	299	52.2	16.5	10	41.9	13.1	54.2	35	16 48	17 16	17 47	11 49	12 16	12 41	13 04	
	03	227	25.1		19.1	314	27.7	16.6	10	28.8	13.2	54.2	30	17 00	17 26	17 55	11 39	12 09	12 37	13 03	
	04	242	24.8		19.4	329	03.3	16.5	10	15.6	13.2	54.2	20	17 20	17 44	18 11	11 22	11 57	12 29	13 00	
	05	257	24.6		19.7	343	38.8	16.6	10	02.4	13.2	54.2	N 10	17 37	18 00	18 26	11 08	11 46	12 23	12 58	
	06	272	24.3	S22	20.1	358	14.4	16.7	N 9	49.2	13.2	54.2	0	17 54	18 16	18 42	10 54	11 36	12 17	12 56	
	07	287	24.1		20.4	12	50.1	16.6	9	36.0	13.3	54.3	S 10	18 10	18 33	19 00	10 40	11 26	12 11	12 54	
	08	302	23.8		20.7	27	25.7	16.7	9	22.7	13.4	54.3	20	18 28	18 53	19 22	10 24	11 15	12 04	12 52	
	09	317	23.5		21.0	42	01.4	16.8	9	09.3	13.3	54.3	30	18 49	19 16	19 49	10 07	11 03	11 56	12 50	
	10	332	23.3		21.3	56	37.2	16.7	8	56.0	13.4	54.3	35	19 01	19 31	20 07	09 57	10 55	11 52	12 48	
	11	347	23.0		21.7	71	12.9	16.8	8	42.6	13.5	54.3	40	19 16	19 48	20 29	09 45	10 47	11 47	12 47	
	12	2	22.8	S22	22.0	85	48.7	16.8	N 8	29.1	13.4	54.3	45	19 33	20 09	20 57	09 31	10 37	11 41	12 45	
	13	17	22.5		22.3	100	24.5	16.8	8	15.7	13.5	54.3	S 50	19 54							

UT	ARIES	VENUS	-4.2	MARS	+1.4	JUPITER	-2.8	SATURN	+0.8	STARS			
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
d h	° /	° /	° /	° /	° /	° /	° /	° /	° /		° /	° /	
WEDNESDAY	6 00	74 31.4	224 27.6	S 9 52.7	188 02.0	S21 58.6	39 45.6	N12 29.8	100 30.8	S12 32.9	Acamar	315 12.1	S40 12.6
	01	89 33.9	239 27.2	53.7	203 02.5	58.9	54 48.3	29.7	115 33.1	32.9	Achernar	335 20.5	S57 07.1
	02	104 36.4	254 26.9	54.7	218 03.1	59.2	69 50.9	29.7	130 35.5	32.8	Acruz	173 01.4	S63 13.6
	03	119 38.8	269 26.5	55.7	233 03.6	59.5	84 53.6	29.6	145 37.8	32.8	Adhara	255 06.3	S29 00.1
	04	134 41.3	284 26.2	56.7	248 04.2	21 59.9	99 56.3	29.6	160 40.1	32.7	Aldebaran	290 40.3	N16 33.5
	05	149 43.8	299 25.8	57.6	263 04.7	22 00.2	114 58.9	29.5	175 42.5	32.7			
	06	164 46.2	314 25.5	S 9 58.6	278 05.3	S22 00.5	130 01.6	N12 29.5	190 44.8	S12 32.6	Alioth	166 14.0	N55 49.6
	07	179 48.7	329 25.1	9 59.6	293 05.8	00.8	145 04.3	29.4	205 47.1	32.6	Alkaid	152 53.1	N49 11.5
	08	194 51.2	344 24.8	10 00.6	308 06.4	01.1	160 06.9	29.3	220 49.5	32.5	Alnair	27 34.2	S46 51.1
	09	209 53.6	359 24.4	01.6	323 06.9	01.4	175 09.6	29.3	235 51.8	32.5	Anilam	275 38.3	S 1 11.1
	10	224 56.1	14 24.1	02.6	338 07.5	01.7	190 12.3	29.2	250 54.2	32.4	Alphard	217 48.5	S 8 45.6
	11	239 58.5	29 23.7	03.6	353 08.0	02.0	205 14.9	29.2	265 56.5	32.4			
	12	255 01.0	44 23.4	S10 04.5	8 08.6	S22 02.3	220 17.6	N12 29.1	280 58.8	S12 32.3	Alphecca	126 04.9	N26 38.0
	13	270 03.5	59 23.0	05.5	23 09.1	02.6	235 20.3	29.1	296 01.2	32.3	Alpheratz	357 35.6	N29 13.5
	14	285 05.9	74 22.6	06.5	38 09.7	02.9	250 22.9	29.0	311 03.5	32.2	Altair	62 01.1	N 8 55.9
	15	300 08.4	89 22.3	07.5	53 10.2	03.2	265 25.6	28.9	326 05.8	32.1	Ankaa	353 07.9	S42 10.8
	16	315 10.9	104 21.9	08.5	68 10.7	03.5	280 28.2	28.9	341 08.2	32.1	Antares	112 17.4	S26 29.0
	17	330 13.3	119 21.6	09.5	83 11.3	03.9	295 30.9	28.8	356 10.5	32.0			
	18	345 15.8	134 21.2	S10 10.5	98 11.8	S22 04.2	310 33.6	N12 28.8	11 12.8	S12 32.0	Arcturus	145 49.0	N19 03.4
	19	0 18.3	149 20.9	11.4	113 12.4	04.5	325 36.2	28.7	26 15.2	31.9	Atria	107 13.0	S69 04.2
	20	15 20.7	164 20.5	12.4	128 12.9	04.8	340 38.9	28.7	41 17.5	31.9	Avior	234 14.7	S59 34.8
	21	30 23.2	179 20.1	13.4	143 13.5	05.1	355 41.6	28.6	56 19.8	31.8	Bellatrix	278 23.5	N 6 22.3
	22	45 25.6	194 19.8	14.4	158 14.0	05.4	10 44.2	28.6	71 22.2	31.8	Betelgeuse	270 52.8	N 7 24.7
23	60 28.1	209 19.4	15.4	173 14.6	05.7	25 46.9	28.5	86 24.5	31.7				
THURSDAY	7 00	75 30.6	224 19.1	S10 16.4	188 15.1	S22 06.0	40 49.6	N12 28.4	101 26.9	S12 31.7	Canopus	263 52.3	S52 42.3
	01	90 33.0	239 18.7	17.3	203 15.6	06.3	55 52.2	28.4	116 29.2	31.6	Capella	280 22.8	N46 01.3
	02	105 35.5	254 18.3	18.3	218 16.2	06.6	70 54.9	28.3	131 31.5	31.6	Deneb	49 26.7	N45 22.1
	03	120 38.0	269 18.0	19.3	233 16.7	06.9	85 57.5	28.3	146 33.9	31.5	Denebola	182 26.0	N14 26.3
	04	135 40.4	284 17.6	20.3	248 17.3	07.2	101 00.2	28.2	161 36.2	31.5	Diphda	348 48.1	S17 51.4
	05	150 42.9	299 17.3	21.3	263 17.8	07.5	116 02.9	28.2	176 38.5	31.4			
	06	165 45.4	314 16.9	S10 22.2	278 18.4	S22 07.8	131 05.5	N12 28.1	191 40.9	S12 31.4	Dubhe	193 42.1	N61 37.1
	07	180 47.8	329 16.5	23.2	293 18.9	08.1	146 08.2	28.1	206 43.2	31.3	Elnath	278 02.7	N28 37.7
	08	195 50.3	344 16.2	24.2	308 19.4	08.4	161 10.8	28.0	221 45.5	31.2	Eltanin	90 43.1	N51 29.2
	09	210 52.8	359 15.8	25.2	323 20.0	08.7	176 13.5	27.9	236 47.9	31.2	Enif	33 39.8	N 9 59.9
	10	225 55.8	14 15.4	26.2	338 20.5	09.0	191 16.2	27.9	251 50.2	31.1	Fomalhaut	15 15.5	S29 29.9
	11	240 57.7	29 15.1	27.1	353 21.1	09.3	206 18.8	27.8	266 52.5	31.1			
	12	256 00.1	44 14.7	S10 28.1	8 21.6	S22 09.6	221 21.5	N12 27.8	281 54.9	S12 31.0	Gacrux	171 52.9	S57 14.5
	13	271 02.6	59 14.3	29.1	23 22.1	09.9	236 24.1	27.7	296 57.2	31.0	Gienah	175 44.7	S17 40.3
	14	286 05.1	74 14.0	30.1	38 22.7	10.2	251 26.8	27.7	311 59.5	30.9	Hadar	148 37.8	S60 29.0
	15	301 07.5	89 13.6	31.1	53 23.2	10.5	266 29.5	27.6	327 01.9	30.9	Hamal	327 52.0	N23 34.6
	16	316 10.0	104 13.2	32.0	68 23.8	10.8	281 32.1	27.6	342 04.2	30.8	Kaus Aust.	83 34.1	S34 22.4
	17	331 12.5	119 12.9	33.0	83 24.3	11.1	296 34.8	27.5	357 06.5	30.8			
	18	346 14.9	134 12.5	S10 34.0	98 24.8	S22 11.4	311 37.4	N12 27.5	12 08.8	S12 30.7	Kochab	137 20.8	N74 03.2
	19	1 17.4	149 12.1	35.0	113 25.4	11.7	326 40.1	27.4	27 11.2	30.7	Markab	13 30.8	N15 20.1
	20	16 19.9	164 11.8	35.9	128 25.9	12.0	341 42.7	27.4	42 13.5	30.6	Menkar	314 06.8	N 4 11.0
	21	31 22.3	179 11.4	36.9	143 26.5	12.2	356 45.4	27.3	57 15.8	30.5	Menkent	147 59.0	S36 29.1
	22	46 24.8	194 11.0	37.9	158 27.0	12.5	11 48.0	27.3	72 18.2	30.5	Miaplacidus	221 38.0	S69 48.5
23	61 27.3	209 10.6	38.9	173 27.5	12.8	26 50.7	27.2	87 20.5	30.4				
FRIDAY	8 00	76 29.7	224 10.3	S10 39.9	188 28.1	S22 13.1	41 53.4	N12 27.1	102 22.8	S12 30.4	Mirfak	308 29.1	N49 56.9
	01	91 32.2	239 09.9	40.8	203 28.6	13.4	56 56.0	27.1	117 25.2	30.3	Nunki	75 49.2	S26 16.1
	02	106 34.6	254 09.5	41.8	218 29.2	13.7	71 58.7	27.0	132 27.5	30.3	Peacock	53 07.6	S56 39.7
	03	121 37.1	269 09.2	42.8	233 29.7	14.0	87 01.3	27.0	147 29.8	30.2	Pollux	243 18.1	N27 58.1
	04	136 39.6	284 08.8	43.8	248 30.2	14.3	102 04.0	26.9	162 32.2	30.2	Procyon	244 51.5	N 5 09.9
	05	151 42.0	299 08.4	44.7	263 30.8	14.6	117 06.6	26.9	177 34.5	30.1			
	06	166 44.5	314 08.0	S10 45.7	278 31.3	S22 14.9	132 09.3	N12 26.8	192 36.8	S12 30.1	Rasalhague	95 59.8	N12 32.6
	07	181 47.0	329 07.7	46.7	293 31.8	15.2	147 11.9	26.8	207 39.2	30.0	Regulus	207 35.3	N11 51.0
	08	196 49.4	344 07.3	47.7	308 32.4	15.5	162 14.6	26.7	222 41.5	29.9	Rigel	281 04.4	S 8 10.4
	09	211 51.9	359 06.9	48.6	323 32.9	15.8	177 17.2	26.7	237 43.8	29.9	Rigil Kent.	139 42.2	S60 55.8
	10	226 54.4	14 06.5	49.6	338 33.4	16.0	192 19.9	26.6	252 46.1	29.8	Sabik	102 04.2	S15 45.2
	11	241 56.8	29 06.2	50.6	353 34.0	16.3	207 22.5	26.6	267 48.5	29.8			
	12	256 59.3	44 05.8	S10 51.5	8 34.5	S22 16.6	222 25.2	N12 26.5	282 50.8	S12 29.7	Schedar	349 31.9	N56 40.4
	13	272 01.7	59 05.4	52.5	23 35.0	16.9	237 27.8	26.5	297 53.1	29.7	Shaula	96 12.1	S37 07.3
	14	287 04.2	74 05.0	53.5	38 35.6	17.2	252 30.5	26.4	312 55.5	29.6	Sirius	258 26.7	S16 44.8
	15	302 06.7	89 04.6	54.5	53 36.1	17.5	267 33.1	26.4	327 57.8	29.6	Spica	158 23.5	S11 17.0
	16	317 09.1	104 04.3	55.4	68 36.7	17.8	282 35.8	26.3	343 00.1	29.5	Suhail	222 46.8	S43 31.4
	17	332 11.6	119 03.9	56.4	83 37.2	18.1	297 38.4	26.3	358 02.4	29.4			
	18	347 14.1	134 03.5	S10 57.4	98 37.7	S22 18.4	312 41.1	N12 26.2	13 04.8	S12 29.4	Vega	80 34.3	N38 48.4
	19	2 16.5	149 03.1	58.4	113 38.3	18.6	327 43.7	26.2	28 07.1	29.3	Zuben'ubi	136 57.3	S16 08.4
	20	17 19.0	164 02.7	10 59.3	128 38.8	18.9	342 46.4	26.1	43 09.4	29.3		SHA	Mer.Pass.
	21	32 21.5	179 02.4	11 00.3	143 39.3	19.2	357 49.0	26.1	58 11.8	29.2		° /	h m
	22	47 23.9	194 02.0	01.3	158 39.9	19.5	12 51.7	26.0	73 14.1	29.2	Venus	148 48.5	h m
23	62 26.4	209 01.6	02.2	173 40.4	19.8	27 54.3	26.0	88 16.4	29.1	Mars	112 44.5	11 27	
	h m									Jupiter	325 19.0	21 13	
Mer.Pass.	18 54.9	v -0.4	d 1.0	v 0.5	d 0.3	v 2.7	d 0.1	v 2.3	d 0.1	Saturn	25 56.3	17 12	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise										
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	6	7	8	9						
	°	'		°	'																		
WEDNESDAY	6 00	182	19.7	S22	25.7	260	59.7	17.0	N	5	45.5	13.8	54.4	N 72	08 05	10 16	11 16	25 20	01 20	03 20	05 37		
	01	197	19.4		26.1	275	35.7	17.1		5	31.7	13.8	54.4	N 70	07 47	09 29	11 16	25 19	01 19	03 11	05 13		
	02	212	19.1		26.4	290	11.8	17.0		5	17.9	13.9	54.4	68	07 33	08 58	11 16	25 19	01 19	03 03	04 55		
	03	227	18.9		26.7	304	47.8	17.1		5	04.0	13.9	54.4	66	07 21	08 35	10 06	25 19	01 19	02 56	04 40		
	04	242	18.6		27.0	319	23.9	17.0		4	50.1	13.9	54.4	64	07 11	08 17	09 31	25 19	01 19	02 51	04 28		
	05	257	18.4		27.3	333	59.9	17.1		4	36.2	13.9	54.4	62	07 02	08 02	09 05	25 19	01 19	02 46	04 18		
	06	272	18.1	S22	27.6	348	36.0	17.1	N	4	22.3	14.0	54.4	60	06 54	07 50	08 46	25 18	01 18	02 42	04 10		
	07	287	17.8		27.9	3	12.1	17.0		4	08.3	13.9	54.4	N 58	06 47	07 39	08 29	00 00	01 18	02 38	04 02		
	08	302	17.6		28.2	17	48.1	17.1		3	54.4	14.0	54.4	56	06 41	07 29	08 15	00 02	01 18	02 35	03 56		
	09	317	17.3		28.5	32	24.2	17.1		3	40.4	14.0	54.5	54	06 35	07 21	08 04	00 05	01 18	02 32	03 50		
	10	332	17.0		28.8	47	00.3	17.1		3	26.4	14.1	54.5	52	06 30	07 13	07 53	00 07	01 18	02 30	03 45		
	11	347	16.8		29.1	61	36.4	17.1		3	12.3	14.0	54.5	50	06 25	07 06	07 44	00 09	01 18	02 28	03 40		
	12	2	16.5	S22	29.4	76	12.5	17.0	N	2	58.3	14.1	54.5	45	06 14	06 51	07 24	00 14	01 18	02 22	03 30		
	13	17	16.3		29.7	90	48.5	17.1		2	44.2	14.1	54.5	N 40	06 04	06 38	07 08	00 18	01 17	02 18	03 21		
	14	32	16.0		30.0	105	24.6	17.1		2	30.1	14.0	54.5	35	05 55	06 26	06 54	00 21	01 17	02 15	03 14		
	15	47	15.7		30.3	120	00.7	17.0		2	16.1	14.2	54.5	30	05 47	06 16	06 43	00 24	01 17	02 12	03 08		
	16	62	15.5		30.6	134	36.7	17.1		2	01.9	14.1	54.5	20	05 31	05 58	06 22	00 29	01 17	02 06	02 57		
	17	77	15.2		30.9	149	12.8	17.0		1	47.8	14.1	54.6	N 10	05 15	05 42	06 04	00 33	01 17	02 01	02 48		
	18	92	14.9	S22	31.2	163	48.8	17.1	N	1	33.7	14.2	54.6	0	04 59	05 25	05 48	00 37	01 17	01 57	02 39		
	19	107	14.7		31.5	178	24.9	17.0		1	19.5	14.2	54.6	S 10	04 41	05 08	05 31	00 41	01 17	01 53	02 30		
	20	122	14.4		31.8	193	00.9	17.0		1	05.3	14.1	54.6	20	04 19	04 48	05 12	00 46	01 17	01 48	02 21		
	21	137	14.1		32.1	207	36.9	17.0		0	51.2	14.2	54.6	30	03 51	04 24	04 51	00 51	01 16	01 43	02 11		
	22	152	13.9		32.4	222	12.9	17.0		0	37.0	14.2	54.6	35	03 33	04 10	04 39	00 54	01 16	01 40	02 05		
	23	167	13.6		32.6	236	48.9	17.0		0	22.8	14.2	54.6	40	03 11	03 52	04 24	00 57	01 16	01 36	01 58		
THURSDAY	7 00	182	13.3	S22	32.9	251	24.9	16.9	N	0	08.6	14.3	54.7	45	02 42	03 31	04 07	01 00	01 16	01 33	01 50		
	01	197	13.1		33.2	266	00.8	17.0	S	0	05.7	14.2	54.7	S 50	02 00	03 02	03 46	01 05	01 16	01 28	01 41		
	02	212	12.8		33.5	280	36.8	16.9		0	19.9	14.2	54.7	52	01 36	02 48	03 36	01 07	01 16	01 26	01 37		
	03	227	12.5		33.8	295	12.7	16.9		0	34.1	14.3	54.7	54	01 00	02 32	03 24	01 09	01 16	01 24	01 32		
	04	242	12.3		34.1	309	48.6	16.9		0	48.4	14.2	54.7	56	///	02 11	03 11	01 11	01 16	01 21	01 27		
	05	257	12.0		34.4	324	24.5	16.8		1	02.6	14.3	54.7	58	///	01 45	02 55	01 14	01 16	01 18	01 21		
	06	272	11.7	S22	34.7	339	00.3	16.9	S	1	16.9	14.3	54.8	S 60	///	01 07	02 36	01 17	01 16	01 15	01 15		
	07	287	11.5		34.9	353	36.2	16.8		1	31.2	14.2	54.8	Lat.		Sunset		Twilight		Moonset			
	08	302	11.2		35.2	8	12.0	16.8		1	45.4	14.3	54.8			Civil		Naut.		6	7	8	9
	09	317	10.9		35.5	22	47.8	16.7		1	59.7	14.3	54.8										
	10	332	10.7		35.8	37	23.5	16.8		2	14.0	14.3	54.8										
	11	347	10.4		36.1	51	59.3	16.6		2	28.3	14.2	54.9	N 72	h m	h m	h m	h m	h m	h m	h m	h m	
	12	2	10.1	S22	36.4	66	34.9	16.7	S	2	42.5	14.3	54.9	N 70	h m	14 14	15 55	13 25	13 02	12 36	12 02	12 02	
	13	17	09.9		36.6	81	10.6	16.6		2	56.8	14.3	54.9	68	12 26	14 44	16 09	13 23	13 05	12 46	12 22	12 22	
	14	32	09.6		36.9	95	46.2	16.6		3	11.1	14.3	54.9	66	13 36	15 07	16 21	13 20	13 08	12 54	12 39	12 39	
	15	47	09.3		37.2	110	21.8	16.6		3	25.4	14.3	54.9	64	14 12	15 25	16 32	13 18	13 10	13 02	12 52	12 52	
	16	62	09.0		37.5	124	57.4	16.5		3	39.7	14.2	55.0	62	14 37	15 40	16 41	13 17	13 12	13 08	13 03	13 03	
	17	77	08.8		37.8	139	32.9	16.5		3	53.9	14.3	55.0	60	14 57	15 53	16 48	13 15	13 14	13 13	13 13	13 13	
	18	92	08.5	S22	38.0	154	08.4	16.5	S	4	08.2	14.3	55.0	N 58	15 13	16 04	16 55	13 14	13 16	13 18	13 21	13 21	
	19	107	08.2		38.3	168	43.9	16.4		4	22.5	14.3	55.0	56	15 27	16 13	17 02	13 12	13 17	13 22	13 29	13 29	
	20	122	08.0		38.6	183	19.3	16.4		4	36.8	14.2	55.0	54	15 39	16 22	17 07	13 11	13 18	13 26	13 36	13 36	
	21	137	07.7		38.9	197	54.7	16.3		4	51.0	14.3	55.1	52	15 49	16 30	17 13	13 10	13 20	13 30	13 42	13 42	
	22	152	07.4		39.1	212	30.0	16.3		5	05.3	14.2	55.1	50	15 59	16 37	17 18	13 09	13 21	13 33	13 47	13 47	
	23	167	07.2		39.4	227	05.3	16.2		5	19.5	14.3	55.1	45	16 18	16 52	17 29	13 07	13 23	13 40	13 59	13 59	
FRIDAY	8 00	182	06.9	S22	39.7	241	40.5	16.2	S	5	33.8	14.2	55.1	N 40	16 35	17 05	17 39	13 06	13 25	13 46	14 09	14 09	
	01	197	06.6		40.0	256	15.7	16.2		5	48.0	14.2	55.1	35	16 48	17 16	17 48	13 04	13 27	13 51	14 18	14 18	
	02	212	06.3		40.2	270	50.9	16.1		6	02.2	14.2	55.2	30	17 00	17 26	17 56	13 03	13 29	13 56	14 25	14 25	
	03	227	06.1		40.5	285	26.0	16.0		6	16.4	14.2	55.2	20	17 20	17 44	18 12	13 00	13 31	14 03	14 38	14 38	
	04	242	05.8		40.8	300	01.0	16.0		6	30.6	14.2	55.2	N 10	17 38	18 01	18 27	12 58	13 34	14 10	14 50	14 50	
	05	257	05.5		41.0	314	36.0	16.0		6	44.8	14.2	55.2	0	17 55	18 17	18 44	12 56	13 36	14 17	15 00	15 00	
	06	272	05.3	S22	41.3	329	11.0	15.9	S	6	59.0	14.2	55.3	S 10	18 12	18 35	19 02	12 54	13 38	14 23	15 11	15 11	
	07	287	05.0		41.6	343	45.9	15.8		7	13.2	14.1	55.3	20	18 30	18 55	19 24	12 52	13 40	14 30	15 23	15 23	
	08	302	04.7		41.8	358	20.7	15.8		7	27.3	14.2	55.3	30	18 51	19 19	19 52	12 50	13 43	14 38	15 36	15 36	
	09	317	04.4		42.1	12	55.5	15.7		7	41.5	14.1	55.3	35	19 04	19 33	20 10	12 48	13 45	14 43	15 44	15 44	
	10	332	04.2		42.4	27	30.2	15.7		7	55.6	14.1	55.4	40	19 18	19 51	20 32	12 47	13 47	14 48	15 53	15 53	
	11	347	03.9		42.6	42	04.9	15.6		8	09.7	14.1	55.4	45	19 36	20 13	21 01	12 45	13 49	14 54	16 1		

UT	ARIES	VENUS	−4.1	MARS	+1.4	JUPIER	−2.8	SATURN	+0.8	STARS			
d h	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "		° ' "	° ' "	
SATURDAY	9 00	77 28.9	224 01.2	S11 03.2	188 40.9	S22 20.1	42 57.0	N12 25.9	103 18.7	S12 29.1	Acamar	315 12.1	S40 12.6
	01	92 31.3	239 00.8	04.2	203 41.5	20.4	57 59.6	25.9	118 21.1	29.0	Achernar	335 20.5	S57 07.2
	02	107 33.8	254 00.4	05.1	218 42.0	20.6	73 02.3	25.8	133 23.4	28.9	Acrux	173 01.3	S63 13.6
	03	122 36.2	269 00.1	06.1	233 42.5	20.9	88 04.9	25.8	148 25.7	28.9	Adhara	255 06.2	S29 00.1
	04	137 38.7	283 59.7	07.1	248 43.0	21.2	103 07.6	25.7	163 28.0	28.8	Aldebaran	290 40.3	N16 33.5
	05	152 41.2	298 59.3	08.0	263 43.6	21.5	118 10.2	25.7	178 30.4	28.8			
	06	167 43.6	313 58.9	S11 09.0	278 44.1	S22 21.8	133 12.9	N12 25.6	193 32.7	S12 28.7	Alioth	166 14.0	N55 49.6
	07	182 46.1	328 58.5	10.0	293 44.6	22.1	148 15.5	25.6	208 35.0	28.7	Alkaid	152 53.0	N49 11.5
	08	197 48.6	343 58.1	11.0	308 45.2	22.3	163 18.2	25.5	223 37.4	28.6	Alnair	27 34.2	S46 51.1
	09	212 51.0	358 57.7	11.9	323 45.7	22.6	178 20.8	25.5	238 39.7	28.6	Anilam	275 38.3	S 1 11.1
	10	227 53.5	13 57.4	12.9	338 46.2	22.9	193 23.4	25.4	253 42.0	28.5	Alphard	217 48.5	S 8 45.6
	11	242 56.0	28 57.0	13.9	353 46.8	23.2	208 26.1	25.4	268 44.3	28.4			
	12	257 58.4	43 56.6	S11 14.8	8 47.3	S22 23.5	223 28.7	N12 25.3	283 46.7	S12 28.4	Alphecca	126 04.9	N26 38.0
	13	273 00.9	58 56.2	15.8	23 47.8	23.7	238 31.4	25.3	298 49.0	28.3	Alpheratz	357 35.6	N29 13.5
	14	288 03.4	73 55.8	16.7	38 48.4	24.0	253 34.0	25.2	313 51.3	28.3	Altair	62 01.1	N 8 55.9
	15	303 05.8	88 55.4	17.7	53 48.9	24.3	268 36.7	25.2	328 53.6	28.2	Ankaa	353 07.9	S42 10.8
	16	318 08.3	103 55.0	18.7	68 49.4	24.6	283 39.3	25.1	343 56.0	28.2	Antares	112 17.3	S26 29.0
	17	333 10.7	118 54.6	19.6	83 49.9	24.9	298 42.0	25.1	358 58.3	28.1			
	18	348 13.2	133 54.2	S11 20.6	98 50.5	S22 25.1	313 44.6	N12 25.0	14 00.6	S12 28.0	Arcturus	145 49.0	N19 03.4
	19	3 15.7	148 53.8	21.6	113 51.0	25.4	328 47.2	25.0	29 02.9	28.0	Atria	107 13.0	S69 04.1
	20	18 18.1	163 53.5	22.5	128 51.5	25.7	343 49.9	24.9	44 05.3	27.9	Avior	234 14.7	S59 34.9
	21	33 20.6	178 53.1	23.5	143 52.1	26.0	358 52.5	24.9	59 07.6	27.9	Bellatrix	278 23.5	N 6 22.3
	22	48 23.1	193 52.7	24.5	158 52.6	26.3	13 55.2	24.8	74 09.9	27.8	Betelgeuse	270 52.7	N 7 24.7
23	63 25.5	208 52.3	25.4	173 53.1	26.5	28 57.8	24.8	89 12.2	27.8				
SUNDAY	10 00	78 28.0	223 51.9	S11 26.4	188 53.6	S22 26.8	44 00.4	N12 24.7	104 14.6	S12 27.7	Canopus	263 52.3	S52 42.3
	01	93 30.5	238 51.5	27.3	203 54.2	27.1	59 03.1	24.7	119 16.9	27.6	Capella	280 22.8	N46 01.3
	02	108 32.9	253 51.1	28.3	218 54.7	27.4	74 05.7	24.6	134 19.2	27.6	Deneb	49 26.7	N45 22.1
	03	123 35.4	268 50.7	29.3	233 55.2	27.6	89 08.4	24.6	149 21.5	27.5	Denebola	182 25.9	N14 26.3
	04	138 37.8	283 50.3	30.2	248 55.7	27.9	104 11.0	24.6	164 23.8	27.5	Diphda	348 48.1	S17 51.4
	05	153 40.3	298 49.9	31.2	263 56.3	28.2	119 13.6	24.5	179 26.2	27.4			
	06	168 42.8	313 49.5	S11 32.2	278 56.8	S22 28.5	134 16.3	N12 24.5	194 28.5	S12 27.4	Dubhe	193 42.1	N61 37.1
	07	183 45.2	328 49.1	33.1	293 57.3	28.7	149 18.9	24.4	209 30.8	27.3	Elnath	278 02.6	N28 37.1
	08	198 47.7	343 48.7	34.1	308 57.8	29.0	164 21.6	24.4	224 33.1	27.2	Eltanin	90 43.2	N51 29.7
	09	213 50.2	358 48.3	35.0	323 58.4	29.3	179 24.2	24.3	239 35.5	27.2	Enif	33 39.8	N 9 59.1
	10	228 52.6	13 47.9	36.0	338 58.9	29.5	194 26.8	24.3	254 37.8	27.1	Fomalhaut	15 15.6	S29 29.9
	11	243 55.1	28 47.5	36.9	353 59.4	29.8	209 29.5	24.2	269 40.1	27.1			
	12	258 57.6	43 47.1	S11 37.9	8 59.9	S22 30.1	224 32.1	N12 24.2	284 42.4	S12 27.0	Gacrux	171 52.9	S57 14.5
	13	274 00.0	58 46.7	38.9	24 00.5	30.4	239 34.7	24.1	299 44.7	26.9	Gienah	175 44.6	S17 40.3
	14	289 02.5	73 46.3	39.8	39 01.0	30.6	254 37.4	24.1	314 47.1	26.9	Hadar	148 37.8	S60 29.0
	15	304 05.0	88 45.9	40.8	54 01.5	30.9	269 40.0	24.0	329 49.4	26.8	Hamal	327 52.0	N23 34.6
	16	319 07.4	103 45.5	41.7	69 02.0	31.2	284 42.6	24.0	344 51.7	26.8	Kaus Aust.	83 34.1	S34 22.4
	17	334 09.9	118 45.1	42.7	84 02.6	31.4	299 45.3	23.9	359 54.0	26.7			
	18	349 12.3	133 44.7	S11 43.7	99 03.1	S22 31.7	314 47.9	N12 23.9	14 56.4	S12 26.7	Kochab	137 20.8	N74 03.2
	19	4 14.8	148 44.3	44.6	114 03.6	32.0	329 50.5	23.9	29 58.7	26.6	Markab	13 30.8	N15 20.1
	20	19 17.3	163 43.9	45.6	129 04.1	32.3	344 53.2	23.8	45 01.0	26.5	Menkar	314 06.8	N 4 11.0
	21	34 19.7	178 43.5	46.5	144 04.7	32.5	359 55.8	23.8	60 03.3	26.5	Menkent	147 59.0	S36 29.1
	22	49 22.2	193 43.1	47.5	159 05.2	32.8	14 58.4	23.7	75 05.6	26.4	Miaplacidus	221 38.0	S69 48.6
23	64 24.7	208 42.7	48.4	174 05.7	33.1	30 01.1	23.7	90 08.0	26.4				
MONDAY	11 00	79 27.1	223 42.3	S11 49.4	189 06.2	S22 33.3	45 03.7	N12 23.6	105 10.3	S12 26.3	Mirfak	308 29.1	N49 56.1
	01	94 29.6	238 41.9	50.3	204 06.7	33.6	60 06.3	23.6	120 12.6	26.2	Nunki	75 49.2	S26 16.1
	02	109 32.1	253 41.4	51.3	219 07.3	33.9	75 09.0	23.5	135 14.9	26.2	Peacock	53 07.6	S56 39.7
	03	124 34.5	268 41.0	52.2	234 07.8	34.1	90 11.6	23.5	150 17.2	26.1	Pollux	243 18.1	N27 58.1
	04	139 37.0	283 40.6	53.2	249 08.3	34.4	105 14.2	23.5	165 19.6	26.1	Procyon	244 51.5	N 5 09.9
	05	154 39.5	298 40.2	54.1	264 08.8	34.7	120 16.9	23.4	180 21.9	26.0			
	06	169 41.9	313 39.8	S11 55.1	279 09.3	S22 34.9	135 19.5	N12 23.4	195 24.2	S12 26.0	Rasalhague	95 59.8	N12 32.6
	07	184 44.4	328 39.4	56.1	294 09.9	35.2	150 22.1	23.3	210 26.5	25.9	Regulus	207 35.3	N11 51.0
	08	199 46.8	343 39.0	57.0	309 10.4	35.5	165 24.8	23.3	225 28.8	25.8	Rigel	281 04.4	S 8 10.4
	09	214 49.3	358 38.6	58.0	324 10.9	35.7	180 27.4	23.2	240 31.2	25.8	Rigel Kent.	139 42.1	S60 55.8
	10	229 51.8	13 38.2	58.9	339 11.4	36.0	195 30.0	23.2	255 33.5	25.7	Sabik	102 04.2	S15 45.2
	11	244 54.2	28 37.8	59.9	354 11.9	36.2	210 32.7	23.1	270 35.8	25.7			
	12	259 56.7	43 37.3	S12 00.8	9 12.5	S22 36.5	225 35.3	N12 23.1	285 38.1	S12 25.6	Schedar	349 31.9	N56 40.4
	13	274 59.2	58 36.9	01.8	24 13.0	36.8	240 37.9	23.1	300 40.4	25.5	Shaula	96 12.0	S37 07.3
	14	290 01.6	73 36.5	02.7	39 13.5	37.0	255 40.5	23.0	315 42.7	25.5	Sirius	258 26.7	S16 44.8
	15	305 04.1	88 36.1	03.7	54 14.0	37.3	270 43.2	23.0	330 45.1	25.4	Spica	158 23.5	S11 17.1
	16	320 06.6	103 35.7	04.6	69 14.5	37.6	285 45.8	22.9	345 47.4	25.4	Suhail	222 46.7	S43 31.5
	17	335 09.0	118 35.3	05.6	84 15.1	37.8	300 48.4	22.9	0 49.7	25.3			
	18	350 11.5	133 34.9	S12 06.5	99 15.6	S22 38.1	315 51.1	N12 22.8	15 52.0	S12 25.2	Vega	80 34.3	N38 48.4
	19	5 14.0	148 34.5	07.5	114 16.1	38.3	330 53.7	22.8	30 54.3	25.2	Zuben'ubi	136 57.3	S16 08.4
	20	20 16.4	163 34.0	08.4	129 16.6	38.6	345 56.3	22.8	45 56.7	25.1			
	21	35 18.9	178 33.6	09.3	144 17.1	38.9	0 58.9	22.7	60 59.0	25.1			
	22	50 21.3	193 33.2	10.3	159 17.7	39.1	16 01.6	22.7	76 01.3	25.0	Venus	145 23.9	h m 9 05
23	65 23.8	208 32.8	11.2	174 18.2	39.4	31 04.2	22.6	91 03.6	24.9	Mars	110 25.6	11 24	
										Jupiter	325 32.4	21 00	
										Saturn	25 46.6	17 00	
Mer.Pass.	18 43.1	v −0.4	d 1.0	v 0.5	d 0.3	v 2.6	d 0.0	v 2.3	d 0.1				

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise						
	GHA	Dec	GHA	°	Dec	d		HP	Naut.		Civil	9	10	11	12		
d h	° /	° /	° /		° /			h m	h m	h m	h m	h m	h m	h m	h m		
SATURDAY	9 00	182 00.3	S22 46.0	231 29.7	14.7	S11 11.0	13.7	55.7	N 72	08 11	10 28	05 37	07 53	08 21	09 54		
	01	197 00.0	46.2	246 03.4	14.6	11 24.7	13.7	55.7	N 70	07 53	09 37	05 13	07 53	08 21	09 54		
	02	211 59.7	46.5	260 37.0	14.6	11 38.4	13.7	55.8	68	07 38	09 04	04 55	07 07	08 21	09 54		
	03	226 59.5	46.7	275 10.6	14.5	11 52.1	13.7	55.8	66	07 25	08 41	10 15	04 40	06 38	09 12		
	04	241 59.2	47.0	289 44.1	14.4	12 05.8	13.6	55.8	64	07 15	08 22	09 37	04 28	06 16	08 21		
	05	256 58.9	47.2	304 17.5	14.3	12 19.4	13.6	55.8	62	07 06	08 07	09 11	04 18	05 58	07 49		
	06	271 58.6	S22 47.5	318 50.8	14.2	S12 33.0	13.5	55.9	60	06 58	07 54	08 50	04 10	05 44	07 26		
	07	286 58.4	47.7	333 24.0	14.2	12 46.5	13.5	55.9	N 58	06 50	07 43	08 34	04 02	05 32	07 07		
	08	301 58.1	48.0	347 57.2	14.1	13 00.0	13.5	55.9	56	06 44	07 33	08 19	03 56	05 21	06 52		
	09	316 57.8	48.2	2 30.3	13.9	13 13.5	13.4	56.0	54	06 38	07 24	08 07	03 50	05 12	06 38		
	10	331 57.5	48.5	17 03.2	13.9	13 26.9	13.4	56.0	52	06 33	07 16	07 57	03 45	05 04	06 27		
	11	346 57.2	48.7	31 36.1	13.9	13 40.3	13.3	56.0	50	06 28	07 09	07 47	03 40	04 56	06 16		
	12	1 57.0	S22 49.0	46 09.0	13.7	S13 53.6	13.3	56.0	45	06 16	06 53	07 27	03 30	04 41	05 55		
	13	16 56.7	49.2	60 41.7	13.6	14 06.9	13.2	56.1	N 40	06 06	06 40	07 11	03 21	04 28	05 38		
	14	31 56.4	49.5	75 14.3	13.5	14 20.1	13.2	56.1	35	05 57	06 29	06 57	03 14	04 17	05 23		
	15	46 56.1	49.7	89 46.8	13.5	14 33.3	13.2	56.1	30	05 49	06 18	06 45	03 08	04 08	05 11		
	16	61 55.8	49.9	104 19.3	13.3	14 46.5	13.1	56.2	20	05 33	06 00	06 24	02 57	03 52	04 50		
	17	76 55.6	50.2	118 51.6	13.3	14 59.6	13.0	56.2	N 10	05 17	05 43	06 06	02 48	03 38	04 32		
	18	91 55.3	S22 50.4	133 23.9	13.1	S15 12.6	13.0	56.2	0	05 00	05 26	05 49	02 39	03 25	04 15		
	19	106 55.0	50.7	147 56.0	13.1	15 25.6	12.9	56.2	S 10	04 42	05 09	05 32	02 30	03 12	03 58		
	20	121 54.7	50.9	162 28.1	13.0	15 38.5	12.9	56.3	20	04 20	04 49	05 13	02 21	02 58	03 40		
	21	136 54.4	51.1	177 00.1	12.8	15 51.4	12.8	56.3	30	03 51	04 24	04 52	02 11	02 43	03 19		
	22	151 54.2	51.4	191 31.9	12.8	16 04.2	12.8	56.3	35	03 33	04 10	04 39	02 05	02 34	03 07		
23	166 53.9	51.6	206 03.7	12.6	16 17.0	12.7	56.4	40	03 11	03 52	04 24	01 58	02 23	02 54			
SUNDAY	10 00	181 53.6	S22 51.8	220 35.3	12.6	S16 29.7	12.6	56.4	45	02 41	03 30	04 07	01 50	02 12	02 38		
	01	196 53.3	52.1	235 06.9	12.5	16 42.3	12.6	56.4	S 50	01 58	03 01	03 45	01 41	01 57	02 18		
	02	211 53.0	52.3	249 38.4	12.3	16 54.9	12.5	56.4	52	01 32	02 47	03 35	01 37	01 51	02 09		
	03	226 52.8	52.6	264 09.7	12.2	17 07.4	12.5	56.5	54	00 54	02 30	03 23	01 32	01 43	01 59		
	04	241 52.5	52.8	278 40.9	12.2	17 19.9	12.4	56.5	56	////	02 09	03 09	01 27	01 35	01 47		
	05	256 52.2	53.0	293 12.1	12.0	17 32.3	12.3	56.5	58	////	01 41	02 53	01 21	01 26	01 33		
	06	271 51.9	S22 53.2	307 43.1	11.9	S17 44.6	12.2	56.6	S 60	////	01 00	02 34	01 15	01 15	01 18		
	07	286 51.6	53.5	322 14.0	11.9	17 56.8	12.2	56.6		Lat.	Sunset	Twilight		Moonset			
	08	301 51.3	53.7	336 44.9	11.7	18 09.0	12.1	56.6				Civil	Naut.	9	10	11	12
	09	316 51.1	53.9	351 15.6	11.6	18 21.1	12.0	56.7									
	10	331 50.8	54.2	5 46.2	11.4	18 33.1	12.0	56.7									
	11	346 50.5	54.4	20 16.6	11.4	18 45.1	11.8	56.7									
	12	1 50.2	S22 54.6	34 47.0	11.3	S18 56.9	11.8	56.7	N 72	h m	13 17	15 33	11 36	h m	h m	h m	
	13	16 49.9	54.8	49 17.3	11.1	19 08.7	11.7	56.8	N 70	h m	14 08	15 52	12 02	10 59	h m	h m	
	14	31 49.6	55.1	63 47.4	11.0	19 20.4	11.7	56.8	68	h m	14 41	16 07	12 22	11 46	h m	h m	
	15	46 49.4	55.3	78 17.4	11.0	19 32.1	11.5	56.8	66	13 30	15 04	16 20	12 39	12 17	11 29	h m	
	16	61 49.1	55.5	92 47.4	10.8	19 43.6	11.5	56.9	64	14 08	15 23	16 30	12 52	12 40	12 21	h m	
	17	76 48.8	55.7	107 17.2	10.6	19 55.1	11.3	56.9	62	14 34	15 38	16 39	13 03	12 58	12 53	12 45	
	18	91 48.5	S22 55.9	121 46.8	10.6	S20 06.4	11.3	56.9	60	14 55	15 51	16 47	13 13	13 14	13 17	13 26	
	19	106 48.2	56.2	136 16.4	10.5	20 17.7	11.2	57.0	N 58	15 11	16 02	16 55	13 21	13 27	13 36	13 55	
	20	121 47.9	56.4	150 45.9	10.3	20 28.9	11.1	57.0	56	15 26	16 12	17 01	13 29	13 38	13 53	14 17	
	21	136 47.7	56.6	165 15.2	10.2	20 40.0	11.0	57.0	54	15 38	16 21	17 07	13 36	13 48	14 06	14 35	
	22	151 47.4	56.8	179 44.4	10.1	20 51.0	10.9	57.1	52	15 49	16 29	17 12	13 42	13 57	14 19	14 50	
23	166 47.1	57.0	194 13.5	10.0	21 01.9	10.9	57.1	50	15 58	16 36	17 18	13 47	14 05	14 29	15 04		
MONDAY	11 00	181 46.8	S22 57.3	208 42.5	9.8	S21 12.8	10.7	57.1	45	16 18	16 52	17 29	13 59	14 22	14 52	15 31	
	01	196 46.5	57.5	223 11.3	9.8	21 23.5	10.6	57.1	N 40	16 35	17 05	17 39	14 09	14 36	15 10	15 53	
	02	211 46.2	57.7	237 40.1	9.6	21 34.1	10.5	57.2	35	16 48	17 16	17 48	14 18	14 48	15 26	16 11	
	03	226 45.9	57.9	252 08.7	9.5	21 44.6	10.4	57.2	30	17 00	17 27	17 57	14 25	14 59	15 39	16 27	
	04	241 45.6	58.1	266 37.2	9.4	21 55.0	10.3	57.2	20	17 21	17 45	18 13	14 38	15 17	16 02	16 53	
	05	256 45.4	58.3	281 05.6	9.2	22 05.3	10.2	57.3	N 10	17 39	18 02	18 28	14 50	15 33	16 22	17 16	
	06	271 45.1	S22 58.5	295 33.8	9.2	S22 15.5	10.1	57.3	0	17 56	18 19	18 45	15 00	15 48	16 40	17 38	
	07	286 44.8	58.8	310 02.0	9.0	22 25.6	10.0	57.3	S 10	18 14	18 37	19 04	15 11	16 03	16 59	17 59	
	08	301 44.5	59.0	324 30.0	8.9	22 35.6	9.8	57.4	20	18 32	18 57	19 26	15 23	16 19	17 19	18 22	
	09	316 44.2	59.2	338 57.9	8.8	22 45.4	9.8	57.4	30	18 54	19 21	19 54	15 36	16 38	17 42	18 49	
	10	331 43.9	59.4	353 25.7	8.6	22 55.2	9.6	57.4	35	19 06	19 36	20 12	15 44	16 48	17 56	19 05	
	11	346 43.6	59.6	7 53.3	8.5	23 04.8	9.5	57.4	40	19 21	19 54	20 35	15 53	17 01	18 12	19 23	
	12	1 43.3	S22 59.8	22 20.8	8.5	S23 14.3	9.4	57.5	45	19 39	20 16	21 05	16 03	17 16	18 31	19 45	
	13	16 43.1	23 00.0	36 48.3	8.2	23 23.7	9.3	57.5	S 50	20 01	20 45	21 48	16 16	17 34	18 55	20 14	
	14	31 42.8	00.2	51 15.5	8.2	23 33.0	9.2	57.5	52	20 11	20 59	22 14	16 22	17 43	19 06	20 28	
	15	46 42.5	00.4	65 42.7	8.1	23 42.2	9.0	57.6	54	20 23	21 16	22 54	16 29	17 52	19 19	20 44	
	16	61 42.2	00.6	80 09.8	7.9	23 51.2	8.9	57.6	56	20 37	21 37	////	16 36	18 03	19 35	21 03	
	17	76 41.9	00.8	94 36.7	7.8	24 00.1	8.8	57.6	S 58	20 53	22 05	////	16 44	18 16	19 53	21 27	
	18	91 41.6	S23 01.0	109 03.5	7.7	S24 08.9	8.6	57.6	S 60	21 12	22 48	////	16 54	18 31	20 15	21 59	
	19	106 41.3	01.2	123 30.2	7.6	24 17.5	8.6	57.7		SUN		MOON					
	20	121 41.0	01.4	137 56.8	7.4	24 26.1	8.3	57.7	Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase	
	21	136 40.8	01.6	152 23.2	7.4	24 34.4	8.3	57.7		00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
	22	151 40.5	01.8	166 49.6	7.2	24 42.7	8.1	57.8	d	m	m	h	h	h	d	%	
23	166 40.2	02.0	181 15.8	7.1	S24 50.8	8.0	57.8	9	08 02	07 48	11 52	08 50	21 12	26	13		
	SD 16.3	d 0.2	SD 15.3	15.5	15.7			10	07 35	07 21	11 53	09 36	22 01	27	7		
								11	07 08	06 54	11 53	10 27	22 55	28	3		

UT		ARIES			VENUS -4.1			MARS +1.4			JUPITER -2.7			SATURN +0.8			STARS		
		GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	Name	SHA	Dec
		° /	'	°	° /	'	°	° /	'	°	° /	'	°	° /	'	°	°	'	°
TUESDAY	1200	80 26.3		S12 12.2	223 32.4		S12 12.2	189 18.7		S22 39.6	46 06.8		N12 22.6	106 05.9		S12 24.9	Acamar	315 12.1	S40 12.6
	01	95 28.7		13.1	238 31.9		13.1	204 19.2		39.9	61 09.4		22.5	121 08.2		24.8	Achernar	335 20.5	S57 07.2
	02	110 31.2		14.1	253 31.5		14.1	219 19.7		40.2	76 12.1		22.5	136 10.6		24.8	Acrux	173 01.3	S63 13.6
	03	125 33.7		15.0	268 31.1		15.0	234 20.2		40.4	91 14.7		22.5	151 12.9		24.7	Adhara	255 06.2	S29 00.1
	04	140 36.1		16.0	283 30.7		16.0	249 20.7		40.7	106 17.3		22.4	166 15.2		24.6	Aldebaran	290 40.3	N16 33.5
	05	155 38.6		16.9	298 30.3		16.9	264 21.3		40.9	121 19.9		22.4	181 17.5		24.6			
	06	170 41.1		S12 17.9	313 29.8		S12 17.9	279 21.8		S22 41.2	136 22.6		N12 22.3	196 19.8		S12 24.5	Alioth	166 14.0	N55 49.6
	07	185 43.5		18.8	328 29.4		18.8	294 22.3		41.4	151 25.2		22.3	211 22.1		24.5	Alkaid	152 53.0	N49 11.4
	08	200 46.0		19.7	343 29.0		19.7	309 22.8		41.7	166 27.8		22.2	226 24.5		24.4	Alnair	27 34.2	S46 51.0
	09	215 48.4		20.7	358 28.6		20.7	324 23.3		41.9	181 30.4		22.2	241 26.8		24.3	Alnilam	275 38.3	S 1 11.2
	10	230 50.9		21.6	13 28.2		21.6	339 23.8		42.2	196 33.0		22.2	256 29.1		24.3	Alphard	217 48.5	S 8 45.6
	11	245 53.4		22.6	28 27.7		22.6	354 24.4		42.5	211 35.7		22.1	271 31.4		24.2			
	12	260 55.8		S12 23.5	43 27.3		S12 23.5	9 24.9		S22 42.7	226 38.3		N12 22.1	286 33.7		S12 24.2	Alphecca	126 04.8	N26 38.0
	13	275 58.3		24.4	58 26.9		24.4	24 25.4		43.0	241 40.9		22.0	301 36.0		24.1	Alpheratz	357 35.6	N29 13.5
	14	291 00.8		25.4	73 26.5		25.4	39 25.9		43.2	256 43.5		22.0	316 38.3		24.0	Altair	62 01.1	N 8 55.9
	15	306 03.2		26.3	88 26.0		26.3	54 26.4		43.5	271 46.1		22.0	331 40.7		24.0	Ankaa	353 07.9	S42 10.8
	16	321 05.7		27.3	103 25.6		27.3	69 26.9		43.7	286 48.8		21.9	346 43.0		23.9	Antares	112 17.3	S26 29.0
	17	336 08.2		28.2	118 25.2		28.2	84 27.4		44.0	301 51.4		21.9	1 45.3		23.9			
	18	351 10.6		S12 29.1	133 24.8		S12 29.1	99 28.0		S22 44.2	316 54.0		N12 21.8	16 47.6		S12 23.8	Arcturus	145 49.0	N19 03.4
	19	6 13.1		30.1	148 24.3		30.1	114 28.5		44.5	331 56.6		21.8	31 49.9		23.7	Atria	107 12.9	S69 04.1
	20	21 15.6		31.0	163 23.9		31.0	129 29.0		44.7	346 59.2		21.8	46 52.2		23.7	Avior	234 14.6	S59 34.9
	21	36 18.0		32.0	178 23.5		32.0	144 29.5		45.0	2 01.9		21.7	61 54.5		23.6	Bellatrix	278 23.5	N 6 22.3
	22	51 20.5		32.9	193 23.0		32.9	159 30.0		45.2	17 04.5		21.7	76 56.9		23.6	Betelgeuse	270 52.7	N 7 24.7
	23	66 22.9		33.8	208 22.6		33.8	174 30.5		45.5	32 07.1		21.6	91 59.2		23.5			
WEDNESDAY	1300	81 25.4		S12 34.8	223 22.2		S12 34.8	189 31.0		S22 45.7	47 09.7		N12 21.6	107 01.5		S12 23.4	Canopus	263 52.2	S52 42.4
	01	96 27.9		35.7	238 21.8		35.7	204 31.5		46.0	62 12.3		21.6	122 03.8		23.4	Capella	280 22.7	N46 01.3
	02	111 30.3		36.6	253 21.3		36.6	219 32.0		46.2	77 14.9		21.5	137 06.1		23.3	Deneb	49 26.7	N45 22.1
	03	126 32.8		37.6	268 20.9		37.6	234 32.6		46.5	92 17.6		21.5	152 08.4		23.2	Denebola	182 25.9	N14 26.3
	04	141 35.3		38.5	283 20.5		38.5	249 33.1		46.7	107 20.2		21.4	167 10.7		23.2	Diphda	348 48.1	S17 51.4
	05	156 37.7		39.5	298 20.0		39.5	264 33.6		47.0	122 22.8		21.4	182 13.0		23.1			
	06	171 40.2		S12 40.4	313 19.6		S12 40.4	279 34.1		S22 47.2	137 25.4		N12 21.4	197 15.4		S12 23.1	Dubhe	193 42.0	N61 37.1
	07	186 42.7		41.3	328 19.2		41.3	294 34.6		47.5	152 28.0		21.3	212 17.7		23.0	Einath	278 02.6	N28 37.7
	08	201 45.1		42.3	343 18.7		42.3	309 35.1		47.7	167 30.6		21.3	227 20.0		22.9	Eltanin	90 43.2	N51 29.1
	09	216 47.6		43.2	358 18.3		43.2	324 35.6		48.0	182 33.3		21.3	242 22.3		22.9	Enif	33 39.8	N 9 59.1
	10	231 50.1		44.1	13 17.9		44.1	339 36.1		48.2	197 35.9		21.2	257 24.6		22.8	Fomalhaut	15 15.6	S29 29.9
	11	246 52.5		45.1	28 17.4		45.1	354 36.6		48.4	212 38.5		21.2	272 26.9		22.8			
	12	261 55.0		S12 46.0	43 17.0		S12 46.0	9 37.2		S22 48.7	227 41.1		N12 21.1	287 29.2		S12 22.7	Gacrux	171 52.8	S57 14.5
	13	276 57.4		46.9	58 16.5		46.9	24 37.7		48.9	242 43.7		21.1	302 31.5		22.6	Gienah	175 44.6	S17 40.3
	14	291 59.9		47.9	73 16.1		47.9	39 38.2		49.2	257 46.3		21.1	317 33.9		22.6	Hadar	148 37.8	S60 29.0
	15	307 02.4		48.8	88 15.7		48.8	54 38.7		49.4	272 48.9		21.0	332 36.2		22.5	Hamal	327 52.0	N23 34.6
	16	322 04.8		49.7	103 15.2		49.7	69 39.2		49.7	287 51.5		21.0	347 38.5		22.4	Kaus Aust.	83 34.1	S34 22.4
	17	337 07.3		50.6	118 14.8		50.6	84 39.7		49.9	302 54.2		20.9	2 40.8		22.4			
	18	352 09.8		S12 51.6	133 14.4		S12 51.6	99 40.2		S22 50.2	317 56.8		N12 20.9	17 43.1		S12 22.3	Kochab	137 20.7	N74 03.2
	19	7 12.2		52.4	148 13.9		52.4	114 40.7		50.4	332 59.4		20.9	32 45.4		22.3	Markab	13 30.8	N15 20.1
	20	22 14.7		53.4	163 13.5		53.4	129 41.2		50.6	348 02.0		20.8	47 47.7		22.2	Menkar	314 06.8	N 4 11.0
	21	37 17.2		54.4	178 13.0		54.4	144 41.7		50.9	3 04.6		20.8	62 50.0		22.1	Menkent	147 59.0	S36 29.1
	22	52 19.6		55.3	193 12.6		55.3	159 42.2		51.1	18 07.2		20.8	77 52.3		22.1	Miaplacidus	221 37.9	S69 48.6
	23	67 22.1		56.2	208 12.2		56.2	174 42.7		51.4	33 09.8		20.7	92 54.6		22.0			
THURSDAY	1400	82 24.6		S12 57.1	223 11.7		S12 57.1	189 43.2		S22 51.6	48 12.4		N12 20.7	107 57.0		S12 21.9	Mirfak	308 29.1	N49 56.9
	01	97 27.0		58.1	238 11.3		58.1	204 43.8		51.8	63 15.0		20.7	122 59.3		21.9	Nunki	75 49.2	S26 16.1
	02	112 29.5		59.0	253 10.8		59.0	219 44.3		52.1	78 17.7		20.6	138 01.6		21.8	Peacock	53 07.6	S56 39.7
	03	127 31.9		12 59.9	268 10.4		12 59.9	234 44.8		52.3	93 20.3		20.6	153 03.9		21.8	Pollux	243 18.1	N27 58.0
	04	142 34.4		13 00.8	283 09.9		13 00.8	249 45.3		52.6	108 22.9		20.5	168 06.2		21.7	Procyon	244 51.5	N 5 09.8
	05	157 36.9		01.8	298 09.5		01.8	264 45.8		52.8	123 25.5		20.5	183 08.5		21.6			
	06	172 39.3		S13 02.7	313 09.1		S13 02.7	279 46.3		S22 53.0	138 28.1		N12 20.5	198 10.8		S12 21.6	Rasalhague	95 59.7	N12 32.6
	07	187 41.8		03.6	328 08.6		03.6	294 46.8		53.3	153 30.7		20.4	213 13.1		21.5	Regulus	207 35.3	N11 51.0
	08	202 44.3		04.5	343 08.2		04.5	309 47.3		53.5	168 33.3		20.4	228 15.4		21.4	Rigel	281 04.4	S 8 10.4
	09	217 46.7		05.5	358 07.7		05.5	324 47.8		53.7	183 35.9		20.4	243 17.7		21.4	Rigel Kent.	139 42.1	S60 55.8
	10	232 49.2		06.4	13 07.3		06.4	339 48.3		54.0	198 38.5		20.3	258 20.0		21.3	Sabik	102 04.2	S15 45.2
	11	247 51.7		07.3	28 06.8		07.3	354 48.8		54.2	213 41.1		20.3	273 22.4		21.3			
	12	262 54.1		S13 08.2	43 06.4		S13 08.2	9 49.3		S22 54.5	228 43.7		N12 20.3	288 24.7		S12 21.2	Schedar	349 31.9	N56 40.4
	13	277 56.6		09.2	58 05.9		09.2	24 49.8		54.7	243 46.3		20.2	303 27.0		21.1	Shaula	96 12.0	S37 07.2
	14	292 59.1		10.1	73 05.5		10.1	39 50.3		54.9	258 48.9		20.2	318 29.3		21.1	Sirius	258 26.7	S16 44.9
	15	308 01.5		11.0	88 05.0		11.0	54 50.8		55.2	273 51.5		20.1	333 31.6		21.0	Spica	158 23.4	S11 17.1
	16	323 04.0		11.9	103 04.6		11.9	69 51.3		55.4	288 54.1		20.1	348 33.9		20.9	Suhail	222 46.7	S43 31.5</

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise											
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	12	13	14	15							
	°	'		°	'																			
TUESDAY	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m				
	12	00	181	39.9	S23	02.2	195	41.9	7.0	S24	58.8	7.8	57.8	N	72	08	17	10	39	08	17			
	01	196	39.6		02.4	210	07.9	6.9	25	06.6	7.7	57.8	N	70	07	57	09	43						
	02	211	39.3		02.6	224	33.8	6.7	25	14.3	7.5	57.9	66		07	42	09	10						
	03	226	39.0		02.8	238	59.5	6.7	25	21.8	7.4	57.9	64		07	29	08	45	10	22				
	04	241	38.7		03.0	253	25.2	6.5	25	29.2	7.3	57.9	62		07	18	08	26	09	43		13 53		
	05	256	38.4		03.2	267	50.7	6.4	25	36.5	7.1	58.0	60		07	09	08	11	09	15	09	54		
	06	271	38.1	S23	03.4	282	16.1	6.4	S25	43.6	7.0	58.0	N	58	06	54	07	46	08	37	08	45		
	07	286	37.8		03.6	296	41.5	6.2	25	50.6	6.8	58.0	56		06	47	07	36	08	23	08	23		
	08	301	37.6		03.8	311	06.7	6.1	25	57.4	6.6	58.0	54		06	41	07	27	08	11	08	06		
	09	316	37.3		04.0	325	31.8	6.0	26	04.0	6.5	58.1	52		06	35	07	19	08	00	07	50		
	10	331	37.0		04.1	339	56.8	5.9	26	10.5	6.4	58.1	50		06	30	07	12	07	50	07	37		
	11	346	36.7		04.3	354	21.7	5.8	26	16.9	6.1	58.1	45		06	19	06	56	07	29	07	11		
	12		1	36.4	S23	04.5	8	46.5	5.6	S26	23.0	6.1	58.2	N	40	06	08	06	42	07	13	06	50	
	13		16	36.1		04.7	23	11.1	5.6	26	29.1	5.8	58.2	35		05	59	06	31	06	59	06	32	
	14		31	35.8		04.9	37	35.7	5.5	26	34.9	5.7	58.2	30		05	51	06	20	06	47	06	17	
	15		46	35.5		05.1	52	00.2	5.4	26	40.6	5.6	58.2	20		05	34	06	02	06	26	05	52	
	16		61	35.2		05.3	66	24.6	5.3	26	46.2	5.3	58.3	N	10	05	18	05	45	06	08	05	30	
	17		76	34.9		05.4	80	48.9	5.2	26	51.5	5.2	58.3	0		05	02	05	28	05	50	05	10	
	18		91	34.6	S23	05.6	95	13.1	5.1	S26	56.7	5.1	58.3	S	10	04	43	05	10	05	33	04	49	
	19		106	34.3		05.8	109	37.2	5.0	27	01.8	4.8	58.3	20		04	21	04	50	05	14	04	28	
	20		121	34.0		06.0	124	01.2	5.0	27	06.6	4.7	58.4	30		03	52	04	25	04	52	04	03	
	21		136	33.8		06.2	138	25.2	4.8	27	11.3	4.5	58.4	35		03	33	04	10	04	40	03	49	
	22		151	33.5		06.4	152	49.0	4.8	27	15.8	4.4	58.4	40		03	11	03	52	04	25	03	32	
	23		166	33.2		06.5	167	12.8	4.6	27	20.2	4.2	58.4	45		02	41	03	30	04	07	03	12	
WEDNESDAY	13	00	181	32.9	S23	06.7	181	36.4	4.6	S27	24.4	4.0	58.5	S	50	01	56	03	01	03	45	02	47	
	01	196	32.6		06.9	196	00.0	4.5	27	28.4	3.8	58.5	52		01	30	02	46	03	34	02	35		
	02	211	32.3		07.1	210	23.5	4.5	27	32.2	3.6	58.5	54		00	48	02	28	03	22	02	22		
	03	226	32.0		07.2	224	47.0	4.4	27	35.8	3.5	58.5	56		////		02	07	03	08	02	06		
	04	241	31.7		07.4	239	10.4	4.3	27	39.3	3.3	58.6	58		////		01	38	02	52	01	47		
	05	256	31.4		07.6	253	33.7	4.2	27	42.6	3.1	58.6	S	60	////		00	53	02	32	01	25		
	06	271	31.1	S23	07.8	267	56.9	4.1	S27	45.7	2.9	58.6												
	07	286	30.8		07.9	282	20.0	4.1	27	48.6	2.7	58.6		Lat.										
	08	301	30.5		08.1	296	43.1	4.1	27	51.3	2.6	58.7		Sunset										
	09	316	30.2		08.3	311	06.2	3.9	27	53.9	2.3	58.7												
	10	331	29.9		08.4	325	29.1	4.0	27	56.2	2.2	58.7												
	11	346	29.6		08.6	339	52.1	3.8	27	58.4	2.0	58.7												
	12		1	29.3	S23	08.8	354	14.9	3.8	S28	00.4	1.8	58.7	N	72									
	13		16	29.0		09.0	8	37.7	3.8	28	02.2	1.6	58.8	N	70									
	14		31	28.7		09.1	23	00.5	3.7	28	03.8	1.4	58.8	66		13	25	15	02	16	19			
	15		46	28.5		09.3	37	23.2	3.7	28	05.2	1.2	58.8	64		14	05	15	22	16	29			15 15
	16		61	28.2		09.5	51	45.9	3.6	28	06.4	1.1	58.8	62		14	32	15	37	16	39	12	45	13 48
	17		76	27.9		09.6	66	08.5	3.6	28	07.5	0.8	58.8	60		14	53	15	51	16	47	13	26	15 06
	18		91	27.6	S23	09.8	80	31.1	3.5	S28	08.3	0.7	58.9	N	58	15	11	16	02	16	54	13	55	14 32
	19		106	27.3		09.9	94	53.6	3.6	28	09.0	0.4	58.9	56		15	25	16	12	17	01	14	17	14 59
	20		121	27.0		10.1	109	16.2	3.5	28	09.4	0.3	58.9	54		15	37	16	21	17	07	14	35	15 20
	21		136	26.7		10.3	123	38.7	3.4	28	09.7	0.1	58.9	52		15	48	16	29	17	13	14	50	15 38
	22		151	26.4		10.4	138	01.1	3.5	28	09.8	0.1	58.9	50		15	58	16	36	17	18	15	04	15 53
	23		166	26.1		10.6	152	23.6	3.4	28	09.7	0.4	59.0	45		16	18	16	52	17	29	15	31	16 24
	THURSDAY	14	00	181	25.8	S23	10.7	166	46.0	3.4	S28	09.3	0.5	59.0	N	40	16	35	17	06	17	40	15	53
01		196	25.5		10.9	181	08.4	3.4	28	08.8	0.7	59.0	35		16	49	17	17	17	49	16	11	17 07	
02		211	25.2		11.1	195	30.8	3.3	28	08.1	0.9	59.0	30		17	01	17	28	17	57	16	27	17 24	
03		226	24.9		11.2	209	53.1	3.4	28	07.2	1.1	59.0	20		17	22	17	46	18	14	16	53	17 52	
04		241	24.6		11.4	224	15.5	3.4	28	06.1	1.3	59.1	N	10	17	41	18	03	18	30	17	16	18 16	
05		256	24.3		11.5	238	37.9	3.3	28	04.8	1.4	59.1	0		17	58	18	20	18	46	17	38	18 39	
06		271	24.0	S23	11.7	253	00.2	3.3	S28	03.4	1.7	59.1	S	10	18	15	18	38	19	05	17	59	19 01	
07		286	23.7		11.8	267	22.5	3.4	28	01.7	1.9	59.1	20		18	34	18	58	19	28	18	22	19 26	
08		301	23.4		12.0	281	44.9	3.3	27	59.8	2.1	59.1	30		18	56	19	23	19	56	18	49	19 54	
09		316	23.1		12.1	296	07.2	3.4	27	57.7	2.3	59.1	35		19	09	19	38	20	15	19	05	20 11	
10		331	22.8		12.3	310	29.6	3.4	27	55.4	2.4	59.2	40		19	23	19	56	20	38	19	23	20 30	
11		346	22.5		12.4	324	52.0	3.4	27	53.0	2.7	59.2	45		19	41	20	18	21	08	19	45	20 53	
12			1	22.2	S23	12.6	339	14.4	3.3	S27	50.3	2.8	59.2	S	50	20	03	20	48	21	52	20	14	21 24
13			16	21.9		12.7	353	36.7	3.5	27	47.5	3.1	59.2	52		20	14	21	03	22	19	20	28	21 39
14			31	21.6		12.9	7	59.2	3.4	27	44.4	3.2	59.2	54		20	26	21	20	23	02	20	44	21 56
15			46	21.3		13.0	22	21.6	3.5	27	41.2	3.5	59.2	56		20	40	21	42	////	////	21	03	22 17
16			61	21.0		13.2	36	44.1	3.4	27	37.7	3.6	59.2	58		20	57	22	11	////	////	21	27	22 43
17			76	20.7		13.3	51	06.5	3.5	27	34.1	3.8	59.3	S	60	21	17	22	57	////	////	21	59	23 20
18			91	20.4	S23	13.5	65	29.0	3.6	S27	30.3	4.0	59.3	</										

2023 DECEMBER 15, 16, 17 (FRI., SAT., SUN.)															
UT		ARIES		VENUS -4.1		MARS +1.4		JUPITER -2.7		SATURN +0.9		STARS			
d h		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
		° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /
15	00	83 23.7	223 01.0	S13 19.3	189 55.4	S22 57.3	49 15.0	N12 19.8	108 52.3	S12 20.4	Acamar	315 12.1	S40 12.7		
	01	98 26.2	238 00.5	20.2	204 55.9	57.5	64 17.6	19.8	123 54.7	20.4	Achernar	335 20.5	S57 07.2		
	02	113 28.6	253 00.0	21.1	219 56.4	57.7	79 20.2	19.8	138 57.0	20.3	Acrux	173 01.2	S63 13.6		
	03	128 31.1	267 59.6	22.0	234 56.9	57.9	94 22.8	19.7	153 59.3	20.2	Adhara	255 06.2	S29 00.2		
	04	143 33.6	282 59.1	22.9	249 57.4	58.2	109 25.4	19.7	169 01.6	20.2	Aldebaran	290 40.3	N16 33.5		
	05	158 36.0	297 58.7	23.9	264 57.9	58.4	124 28.0	19.7	184 03.9	20.1					
	06	173 38.5	312 58.2	S13 24.8	279 58.4	S22 58.6	139 30.6	N12 19.6	199 06.2	S12 20.1	Alioth	166 13.9	N55 49.6		
	07	188 40.9	327 57.8	25.7	294 58.9	58.9	154 33.2	19.6	214 08.5	20.0	Alkaid	152 53.0	N49 11.4		
	08	203 43.4	342 57.3	26.6	309 59.4	59.1	169 35.8	19.6	229 10.8	19.9	Alnair	27 34.2	S46 51.0		
	09	218 45.9	357 56.9	27.5	324 59.9	59.3	184 38.4	19.5	244 13.1	19.9	Alnilam	275 38.3	S 1 11.2		
	10	233 48.3	12 56.4	28.4	340 00.4	59.5	199 41.0	19.5	259 15.4	19.8	Alphard	217 48.4	S 8 45.6		
	11	248 50.8	27 55.9	29.3	355 00.9	22 59.8	214 43.6	19.5	274 17.7	19.7					
	12	263 53.3	42 55.5	S13 30.2	10 01.4	S23 00.0	229 46.2	N12 19.4	289 20.0	S12 19.7	Alphecca	126 04.8	N26 38.0		
	13	278 55.7	57 55.0	31.2	25 01.9	00.2	244 48.8	19.4	304 22.3	19.6	Alpheratz	357 35.7	N29 13.5		
	14	293 58.2	72 54.6	32.1	40 02.4	00.4	259 51.4	19.4	319 24.6	19.5	Altair	62 01.1	N 8 55.9		
	15	309 00.7	87 54.1	33.0	55 02.9	00.7	274 54.0	19.3	334 26.9	19.5	Ankaa	353 07.9	S42 10.8		
	16	324 03.1	102 53.6	33.9	70 03.4	00.9	289 56.5	19.3	349 29.2	19.4	Antares	112 17.3	S26 29.0		
	17	339 05.6	117 53.2	34.8	85 03.9	01.1	304 59.1	19.3	4 31.5	19.3					
	18	354 08.1	132 52.7	S13 35.7	100 04.4	S23 01.3	320 01.7	N12 19.2	19 33.8	S12 19.3	Arcturus	145 49.0	N19 03.4		
	19	9 10.5	147 52.2	36.6	115 04.9	01.6	335 04.3	19.2	34 36.1	19.2	Atria	107 12.9	S69 04.1		
	20	24 13.0	162 51.8	37.5	130 05.4	01.8	350 06.9	19.2	49 38.4	19.1	Avior	234 14.6	S59 34.9		
	21	39 15.4	177 51.3	38.4	145 05.8	02.0	5 09.5	19.1	64 40.7	19.1	Bellatrix	278 23.5	N 6 22.3		
	22	54 17.9	192 50.8	39.3	160 06.3	02.2	20 12.1	19.1	79 43.0	19.0	Betelgeuse	270 52.7	N 7 24.7		
	23	69 20.4	207 50.4	40.2	175 06.8	02.5	35 14.7	19.1	94 45.4	19.0					
16	00	84 22.8	222 49.9	S13 41.2	190 07.3	S23 02.7	50 17.3	N12 19.1	109 47.7	S12 18.9	Canopus	263 52.2	S52 42.4		
	01	99 25.3	237 49.4	42.1	205 07.8	02.9	65 19.9	19.0	124 50.0	18.8	Capella	280 22.7	N46 01.3		
	02	114 27.8	252 49.0	43.0	220 08.3	03.1	80 22.5	19.0	139 52.3	18.8	Deneb	49 26.8	N45 22.1		
	03	129 30.2	267 48.5	43.9	235 08.8	03.3	95 25.1	19.0	154 54.6	18.7	Denebola	182 25.9	N14 26.3		
	04	144 32.7	282 48.0	44.8	250 09.3	03.6	110 27.7	18.9	169 56.9	18.6	Diphda	348 48.1	S17 51.4		
	05	159 35.2	297 47.6	45.7	265 09.8	03.8	125 30.3	18.9	184 59.2	18.6					
	06	174 37.6	312 47.1	S13 46.6	280 10.3	S23 04.0	140 32.9	N12 18.9	200 01.5	S12 18.5	Dubhe	193 42.0	N61 37.1		
	07	189 40.1	327 46.6	47.5	295 10.8	04.2	155 35.5	18.8	215 03.8	18.4	Elnath	278 02.6	N28 37.7		
	08	204 42.6	342 46.2	48.4	310 11.3	04.4	170 38.0	18.8	230 06.1	18.4	Eltanin	90 43.1	N51 29.1		
	09	219 45.0	357 45.7	49.3	325 11.8	04.7	185 40.6	18.8	245 08.4	18.3	Enif	33 39.8	N 9 59.1		
	10	234 47.5	12 45.2	50.2	340 12.3	04.9	200 43.2	18.7	260 10.7	18.2	Fomalhaut	15 15.6	S29 29.9		
	11	249 49.9	27 44.7	51.1	355 12.8	05.1	215 45.8	18.7	275 13.0	18.2					
	12	264 52.4	42 44.3	S13 52.0	10 13.3	S23 05.3	230 48.4	N12 18.7	290 15.3	S12 18.1	Gacrux	171 52.8	S57 14.5		
	13	279 54.9	57 43.8	52.9	25 13.8	05.5	245 51.0	18.7	305 17.6	18.0	Gienah	175 44.6	S17 40.3		
	14	294 57.3	72 43.3	53.8	40 14.3	05.7	260 53.6	18.6	320 19.9	18.0	Hadar	148 37.7	S60 29.0		
	15	309 59.8	87 42.9	54.7	55 14.8	06.0	275 56.2	18.6	335 22.2	17.9	Hamal	327 52.0	N23 34.6		
	16	325 02.3	102 42.4	55.6	70 15.3	06.2	290 58.8	18.6	350 24.5	17.8	Kaus Aust.	83 34.1	S34 22.4		
	17	340 04.7	117 41.9	56.5	85 15.8	06.4	306 01.4	18.5	5 26.8	17.8					
	18	355 07.2	132 41.4	S13 57.4	100 16.3	S23 06.6	321 03.9	N12 18.5	20 29.1	S12 17.7	Kochab	137 20.7	N74 03.2		
	19	10 09.7	147 41.0	58.3	115 16.8	06.8	336 06.5	18.5	35 31.4	17.6	Markab	13 30.8	N15 20.1		
	20	25 12.1	162 40.5	59.2	130 17.2	07.0	351 09.1	18.5	50 33.7	17.6	Menkar	314 06.8	N 4 11.0		
	21	40 14.6	177 40.0	14 00.1	145 17.7	07.2	6 11.7	18.4	65 36.0	17.5	Menkent	147 58.9	S36 29.1		
	22	55 17.1	192 39.5	01.0	160 18.2	07.5	21 14.3	18.4	80 38.3	17.4	Miaplacidus	221 37.9	S69 48.6		
	23	70 19.5	207 39.0	01.9	175 18.7	07.7	36 16.9	18.4	95 40.6	17.4					
17	00	85 22.0	222 38.6	S14 02.8	190 19.2	S23 07.9	51 19.5	N12 18.3	110 42.9	S12 17.3	Mirfak	308 29.1	N49 56.9		
	01	100 24.4	237 38.1	03.7	205 19.7	08.1	66 22.0	18.3	125 45.2	17.2	Nunki	75 49.2	S26 16.1		
	02	115 26.9	252 37.6	04.6	220 20.2	08.3	81 24.6	18.3	140 47.5	17.2	Peacock	53 07.6	S56 39.7		
	03	130 29.4	267 37.1	05.4	235 20.7	08.5	96 27.2	18.3	155 49.8	17.1	Pollux	243 18.1	N27 58.0		
	04	145 31.8	282 36.7	06.3	250 21.2	08.7	111 29.8	18.2	170 52.1	17.0	Procyon	244 51.5	N 5 09.8		
	05	160 34.3	297 36.2	07.2	265 21.7	08.9	126 32.4	18.2	185 54.4	17.0					
	06	175 36.8	312 35.7	S14 08.1	280 22.2	S23 09.2	141 35.0	N12 18.2	200 56.7	S12 16.9	Rasalhague	95 59.7	N12 32.5		
	07	190 39.2	327 35.2	09.0	295 22.7	09.4	156 37.5	18.1	215 59.0	16.8	Regulus	207 35.3	N11 51.0		
	08	205 41.7	342 34.7	09.9	310 23.2	09.6	171 40.1	18.1	231 01.3	16.8	Rigel	281 04.4	S 8 10.4		
	09	220 44.2	357 34.2	10.8	325 23.6	09.8	186 42.7	18.1	246 03.6	16.7	Rigil Kent.	139 42.0	S60 55.8		
	10	235 46.6	12 33.8	11.7	340 24.1	10.0	201 45.3	18.1	261 05.9	16.6	Sabik	102 04.2	S15 45.2		
	11	250 49.1	27 33.3	12.6	355 24.6	10.2	216 47.9	18.0	276 08.2	16.6					
	12	265 51.5	42 32.8	S14 13.5	10 25.1	S23 10.4	231 50.5	N12 18.0	291 10.5	S12 16.5	Schedar	349 31.9	N56 40.4		
	13	280 54.0	57 32.3	14.4	25 25.6	10.6	246 53.0	18.0	306 12.8	16.4	Shaula	96 12.0	S37 07.2		
	14	295 56.5	72 31.8	15.2	40 26.1	10.8	261 55.6	18.0	321 15.1	16.4	Sirius	258 26.7	S16 44.9		
	15	310 58.9	87 31.3	16.1	55 26.6	11.0	276 58.2	17.9	336 17.4	16.3	Spica	158 23.4	S11 17.1		
	16	326 01.4	102 30.8	17.0	70 27.1	11.2	292 00.8	17.9	351 19.7	16.2	Suhail	222 46.7	S43 31.5		
	17	341 03.9	117 30.4	17.9	85 27.6	11.4	307 03.4	17.9	6 22.0	16.2					
	18	356 06.3	132 29.9	S14 18.8	100 28.1	S23 11.6	322 05.9	N12 17.8	21 24.3	S12 16.1	Vega	80 34.3	N38 48.4		
	19	11 08.8	147 29.4	19.7	115 28.5	11.8	337 08.5	17.8	36 26.6	16.0	Zuben'ubi	136 57.3	S16 08.4		
	20	26 11.3	162 28.9	20.6	130 29.0	12.0	352 11.1	17.8	51 28.8	16.0					
	21	41 13.7	177 28.4	21.4	145 29.5	12.3	7 13.7	17.8	66 31.1	15.9					
	22	56 16.2	192 27.9	22.3	160 30.0	12.5	22 16.3	17.7	81 33.4	15.8	Venus	138 27.1	9 09		
	23	71 18.7	207 27.4	23.2	175 30.5	12.7	37 18.8	17.7	96 35.7	15.8	Mars	105 44.5	11 19		
h m															

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	15	16	17	18
	°	'		°	'												
FRI DAY	15 ^d 00 ^h	181	18.6	S23	14.3	151	44.9	3.7	S27	03.4	5.2	59.4	N 72	08 21	10 49	14 46	13 32
	01	196	18.3		14.5	166	07.6	3.9	26	58.2	5.3	59.4	N 70	08 01	09 49	14 02	13 15
	02	211	18.0		14.6	180	30.5	3.9	26	52.9	5.6	59.4	68	07 45	09 14	14 51	13 01
	03	226	17.7		14.7	194	53.4	3.9	26	47.3	5.7	59.4	66	07 32	08 49	13 43	13 09
	04	241	17.4		14.9	209	16.3	4.0	26	41.6	5.9	59.4	64	07 21	08 30	13 53	12 40
	05	256	17.1		15.0	223	39.3	4.0	26	35.7	6.0	59.4	62	07 12	08 14	12 48	12 36
	06	271	16.8	S23	15.1	238	02.3	4.1	S26	29.7	6.3	59.4	60	07 04	08 00	12 13	12 23
	07	286	16.5		15.3	252	25.4	4.2	26	23.4	6.4	59.4	N 58	06 56	07 49	11 47	12 18
	08	301	16.2		15.4	266	48.6	4.3	26	17.0	6.7	59.4	56	06 49	07 39	11 27	12 03
	09	316	15.9		15.5	281	11.9	4.3	26	10.3	6.8	59.4	54	06 43	07 30	11 10	11 54
	10	331	15.6		15.7	295	35.2	4.3	26	03.5	6.9	59.5	52	06 38	07 21	10 55	11 47
	11	346	15.3		15.8	309	58.5	4.5	25	56.6	7.2	59.5	50	06 32	07 14	10 43	11 40
	12	1	15.0	S23	15.9	324	22.0	4.5	S25	49.4	7.3	59.5	45	06 21	06 58	10 16	11 25
	13	16	14.7		16.1	338	45.5	4.6	25	42.1	7.5	59.5	N 40	06 10	06 45	09 55	11 12
	14	31	14.4		16.2	353	09.1	4.6	25	34.6	7.7	59.5	35	06 01	06 33	09 38	11 02
	15	46	14.1		16.3	7	32.7	4.7	25	26.9	7.8	59.5	30	05 52	06 22	09 23	10 53
	16	61	13.8		16.5	21	56.4	4.8	25	19.1	8.1	59.5	20	05 36	06 04	09 07	10 37
	17	76	13.5		16.6	36	20.2	4.9	25	11.0	8.1	59.5	N 10	05 20	05 46	08 35	10 23
	18	91	13.2	S23	16.7	50	44.1	5.0	S25	02.9	8.4	59.5	0	05 03	05 29	08 14	09 09
	19	106	12.9		16.8	65	08.1	5.1	24	54.5	8.5	59.5	S 10	04 44	05 11	07 53	08 56
	20	121	12.6		17.0	79	32.2	5.1	24	46.0	8.7	59.5	20	04 22	04 51	07 31	08 37
	21	136	12.3		17.1	93	56.3	5.2	24	37.3	8.9	59.5	30	03 53	04 26	07 05	08 15
	22	151	12.0		17.2	108	20.5	5.3	24	28.4	9.0	59.5	35	03 34	04 11	06 49	08 02
	23	166	11.7		17.3	122	44.8	5.4	24	19.4	9.1	59.6	40	03 11	03 53	06 31	07 48
SAT URDAY	16 ^d 00	181	11.4	S23	17.4	137	09.2	5.5	S24	10.3	9.4	59.6	S 50	01 56	03 01	05 42	07 08
	01	196	11.1		17.6	151	33.7	5.6	24	00.9	9.4	59.6	52	01 28	02 46	05 29	06 57
	02	211	10.8		17.7	165	58.3	5.6	23	51.5	9.7	59.6	54	00 44	02 28	05 14	06 45
	03	226	10.5		17.8	180	22.9	5.8	23	41.8	9.8	59.6	56	////	02 06	03 08	06 31
	04	241	10.2		17.9	194	47.7	5.8	23	32.0	9.9	59.6	58	////	01 37	02 51	06 15
	05	256	09.9		18.0	209	12.5	6.0	23	22.1	10.1	59.6	S 60	////	00 48	02 31	05 55
	06	271	09.6	S23	18.1	223	37.5	6.0	S23	12.0	10.2	59.6		Lat.	Sunset	Twilight	
	07	286	09.3		18.3	238	02.5	6.1	23	01.8	10.4	59.6				Civil	
	08	301	09.0		18.4	252	27.6	6.3	22	51.4	10.6	59.6				Naut.	
	09	316	08.7		18.5	266	52.9	6.3	22	40.8	10.6	59.6				15	16
	10	331	08.4		18.6	281	18.2	6.4	22	30.2	10.9	59.6				17	18
	11	346	08.0		18.7	295	43.6	6.5	22	19.3	10.9	59.6				h m	h m
	12	1	07.7	S23	18.8	310	09.1	6.6	S22	08.4	11.1	59.6	N 72	13 02	15 30	18 24	21 26
	13	16	07.4		18.9	324	34.7	6.7	21	57.3	11.3	59.6	N 70	14 02	15 50	19 07	21 41
	14	31	07.1		19.0	339	00.4	6.8	21	46.0	11.3	59.6	68	14 37	16 05	19 35	21 52
	15	46	06.8		19.2	353	26.2	6.9	21	34.7	11.5	59.6	66	13 22	15 02	17 28	22 02
	16	61	06.5		19.3	7	52.1	7.0	21	23.2	11.7	59.6	64	14 04	15 21	18 03	22 09
	17	76	06.2		19.4	22	18.1	7.1	21	11.5	11.7	59.6	62	14 32	15 37	18 28	22 16
	18	91	05.9	S23	19.5	36	44.2	7.2	S20	59.8	11.9	59.6	60	14 53	15 50	18 47	22 22
	19	106	05.6		19.6	51	10.4	7.3	20	47.9	12.0	59.6	N 58	15 10	16 02	17 19	20 48
	20	121	05.3		19.7	65	36.7	7.4	20	35.9	12.2	59.6	56	15 25	16 12	17 39	20 57
	21	136	05.0		19.8	80	03.1	7.5	20	23.7	12.2	59.6	54	15 38	16 21	17 08	21 04
	22	151	04.7		19.9	94	29.6	7.6	20	11.5	12.4	59.6	52	15 49	16 29	17 13	21 11
	23	166	04.4		20.0	108	56.2	7.7	19	59.1	12.5	59.6	50	15 58	16 37	17 18	21 17
SUN DAY	17 ^d 00	181	04.1	S23	20.1	123	22.9	7.8	S19	46.6	12.6	59.6	45	16 19	16 53	17 30	21 47
	01	196	03.8		20.2	137	49.7	7.9	19	34.0	12.8	59.6	N 40	16 36	17 06	17 40	21 55
	02	211	03.5		20.3	152	16.6	8.0	19	21.2	12.8	59.6	35	16 50	17 18	17 50	22 00
	03	226	03.2		20.4	166	43.6	8.0	19	08.4	13.0	59.6	30	17 02	17 29	17 58	22 04
	04	241	02.9		20.5	181	10.6	8.2	18	55.4	13.1	59.6	20	17 23	17 47	18 15	22 12
	05	256	02.6		20.6	195	37.8	8.3	18	42.3	13.1	59.6	N 10	17 42	18 05	18 31	22 18
	06	271	02.3	S23	20.7	210	05.1	8.4	S18	29.2	13.3	59.6	0	17 57	18 22	18 48	22 24
	07	286	02.0		20.8	224	32.5	8.4	18	15.9	13.4	59.6	S 10	18 17	18 40	19 07	22 30
	08	301	01.7		20.9	238	59.9	8.6	18	02.5	13.5	59.6	20	18 36	19 00	19 29	22 37
	09	316	01.3		21.0	253	27.5	8.6	17	49.0	13.6	59.6	30	18 58	19 25	19 58	22 44
	10	331	01.0		21.1	267	55.1	8.8	17	35.4	13.7	59.6	35	19 11	19 40	20 17	22 50
	11	346	00.7		21.1	282	22.9	8.8	17	21.7	13.8	59.6	40	19 26	19 58	20 40	22 56
	12	1	00.4	S23	21.2	296	50.7	9.0	S17	07.9	13.9	59.6	45	19 44	20 21	21 11	23 02
	13	16	00.1		21.3	311	18.7	9.0	16	54.0	13.9	59.6	S 50	20 06	20 51	21 56	23 08
	14	30	59.8		21.4	325	46.7	9.1	16	40.1	14.1	59.6	52	20 17	21 06	22 23	23 14
	15	45	59.5		21.5	340	14.8	9.2	16	26.0	14.2	59.6	54	20 29	21 23	23 09	23 20
	16	60	59.2		21.6	354	43.0	9.3	16	11.8	14.2	59.5	56	20 43	21 46	////	23 26
	17	75	58.9		21.7	9	11.3	9.4	15	57.6	14.3	59.5	58	21 00	22 15	////	23 36
	18	90	58.6	S23	21.8	23	39.7	9.5	S15	43.3	14.5	59.5	S 60	21 20	23 04	////	23 53
	19	105	58.3		21.9	38	08.2	9.6	15	28.8	14.5	59.5				SUN	
	20	120	58.0		21.9	52	36.8	9.6	15	14.3	14.5	59.5				MOON	
	21	135	57.7		22.0	67	05.4	9.8	14	59.8	14.7	59.5	Day	Eqn. of Time	Mer.	Mer. Pass.	
	22	150	57.4		22.1	81	34.2	9.8	14	45.1	14.7	59.5		00 ^h	12 ^h	Upper	Lower
	23	165	57.1		22.2	96	03.0	9.9	S14	30.4	14.8	59.5		Pass.		Age	Phase
		SD	16.3	d	0.1	SD	16.2	16.2	16.2				d	m s	m s	h m	h m
													15	05 15	05 01	11 55	14 29
													16	04 46	04 32	11 55	15 27
													17	04 17	04 02	11 56	16 22



UT		ARIES			VENUS -4.1			MARS +1.4			JUPITER -2.7			SATURN +0.9			STARS			
		GHA		GHA	Dec	GHA		Dec	GHA		Dec	GHA		Dec	GHA		Dec	Name	SHA	Dec
MONDAY	1800	86 21.1	222 26.9	S14 24.1	190 31.0	S23 12.9		52 21.4	N12 17.7		111 38.0	S12 15.7		Acamar	315 12.1	S40 12.7				
	01	101 23.6	237 26.4	25.0	205 31.5	13.1		67 24.0	17.7		126 40.3	15.6		Achernar	335 20.5	S57 07.2				
	02	116 26.0	252 25.9	25.9	220 32.0	13.3		82 26.6	17.6		141 42.6	15.6		Acrux	173 01.2	S63 13.6				
	03	131 28.5	267 25.5	26.7	235 32.5	13.5		97 29.1	17.6		156 44.9	15.5		Adhara	255 06.2	S29 00.2				
	04	146 31.0	282 25.0	27.6	250 32.9	13.7		112 31.7	17.6		171 47.2	15.4		Aldebaran	290 40.3	N16 33.5				
	05	161 33.4	297 24.5	28.5	265 33.4	13.9		127 34.3	17.6		186 49.5	15.4								
	06	176 35.9	312 24.0	S14 29.4	280 33.9	S23 14.1		142 36.9	N12 17.5		201 51.8	S12 15.3		Alioth	166 13.9	N55 49.5				
	07	191 38.4	327 23.5	30.3	295 34.4	14.3		157 39.4	17.5		216 54.1	15.2		Alkaid	152 53.0	N49 11.4				
	08	206 40.8	342 23.0	31.1	310 34.9	14.5		172 42.0	17.5		231 56.4	15.2		Alnair	27 34.2	S46 51.0				
	09	221 43.3	357 22.5	32.0	325 35.4	14.7		187 44.6	17.5		246 58.7	15.1		Alnilam	275 38.3	S 1 11.2				
	10	236 45.8	12 22.0	32.9	340 35.9	14.9		202 47.2	17.4		262 01.0	15.0		Alphard	217 48.4	S 8 45.7				
	11	251 48.2	27 21.5	33.8	355 36.4	15.1		217 49.7	17.4		277 03.3	15.0								
	12	266 50.7	42 21.0	S14 34.7	10 36.8	S23 15.3		232 52.3	N12 17.4		292 05.6	S12 14.9		Alphecca	126 04.8	N26 38.0				
	13	281 53.2	57 20.5	35.5	25 37.3	15.5		247 54.9	17.4		307 07.9	14.8		Alpheratz	357 35.7	N29 13.5				
	14	296 55.6	72 20.0	36.4	40 37.8	15.7		262 57.5	17.3		322 10.2	14.8		Altair	62 01.1	N 8 55.9				
	15	311 58.1	87 19.5	37.3	55 38.3	15.9		278 00.0	17.3		337 12.5	14.7		Ankaa	353 07.9	S42 10.8				
	16	327 00.5	102 19.0	38.2	70 38.8	16.1		293 02.6	17.3		352 14.8	14.6		Antares	112 17.3	S26 29.0				
	17	342 03.0	117 18.5	39.0	85 39.3	16.2		308 05.2	17.3		7 17.1	14.6								
	18	357 05.5	132 18.0	S14 39.9	100 39.8	S23 16.4		323 07.8	N12 17.2		22 19.3	S12 14.5		Arcturus	145 48.9	N19 03.4				
	19	12 07.9	147 17.5	40.8	115 40.2	16.6		338 10.3	17.2		37 21.6	14.4		Atria	107 12.9	S69 04.1				
	20	27 10.4	162 17.0	41.6	130 40.7	16.8		353 12.9	17.2		52 23.9	14.4		Avior	234 14.6	S59 34.9				
	21	42 12.9	177 16.5	42.5	145 41.2	17.0		8 15.5	17.2		67 26.2	14.3		Bellatrix	278 23.5	N 6 22.3				
	22	57 15.3	192 16.0	43.4	160 41.7	17.2		23 18.0	17.2		82 28.5	14.2		Betelgeuse	270 52.7	N 7 24.7				
	23	72 17.8	207 15.5	44.3	175 42.2	17.4		38 20.6	17.1		97 30.8	14.1								
TUESDAY	1900	87 20.3	222 15.0	S14 45.1	190 42.7	S23 17.6		53 23.2	N12 17.1		112 33.1	S12 14.1		Canopus	263 52.2	S52 42.4				
	01	102 22.7	237 14.5	46.0	205 43.1	17.8		68 25.7	17.1		127 35.4	14.0		Capella	280 22.7	N46 01.3				
	02	117 25.2	252 14.0	46.9	220 43.6	18.0		83 28.3	17.1		142 37.7	13.9		Deneb	49 26.8	N45 22.1				
	03	132 27.6	267 13.5	47.7	235 44.1	18.2		98 30.9	17.0		157 40.0	13.9		Denebola	182 25.9	N14 26.2				
	04	147 30.1	282 13.0	48.6	250 44.6	18.4		113 33.4	17.0		172 42.3	13.8		Diphda	348 48.1	S17 51.4				
	05	162 32.6	297 12.5	49.5	265 45.1	18.6		128 36.0	17.0		187 44.6	13.7								
	06	177 35.0	312 12.0	S14 50.3	280 45.6	S23 18.8		143 38.6	N12 17.0		202 46.9	S12 13.7		Dubhe	193 41.9	N61 37.1				
	07	192 37.5	327 11.5	51.2	295 46.0	18.9		158 41.1	17.0		217 49.2	13.6		Elnath	278 02.6	N28 37.7				
	08	207 40.0	342 11.0	52.1	310 46.5	19.1		173 43.7	16.9		232 51.4	13.5		Eltanin	90 43.1	N51 29.1				
	09	222 42.4	357 10.4	52.9	325 47.0	19.3		188 46.3	16.9		247 53.7	13.5		Enif	33 39.8	N 9 59.1				
	10	237 44.9	12 09.9	53.8	340 47.5	19.5		203 48.8	16.9		262 56.0	13.4		Fomalhaut	15 15.6	S29 29.9				
	11	252 47.4	27 09.4	54.7	355 48.0	19.7		218 51.4	16.9		277 58.3	13.3								
	12	267 49.8	42 08.9	S14 55.5	10 48.5	S23 19.9		233 54.0	N12 16.8		293 00.6	S12 13.3		Gacrux	171 52.8	S57 14.5				
	13	282 52.3	57 08.4	56.4	25 48.9	20.1		248 56.5	16.8		308 02.9	13.2		Gienah	175 44.5	S17 40.3				
	14	297 54.8	72 07.9	57.3	40 49.4	20.3		263 59.1	16.8		323 05.2	13.1		Hadar	148 37.7	S60 29.0				
	15	312 57.2	87 07.4	58.1	55 49.9	20.5		279 01.7	16.8		338 07.5	13.0		Hamal	327 52.0	N23 34.6				
	16	327 59.7	102 06.9	59.0	70 50.4	20.6		294 04.2	16.8		353 09.8	13.0		Kaus Aust.	83 34.1	S34 22.4				
	17	343 02.1	117 06.4	14 59.9	85 50.9	20.8		309 06.8	16.7		8 12.1	12.9								
	18	358 04.6	132 05.8	S15 00.7	100 51.3	S23 21.0		324 09.4	N12 16.7		23 14.4	S12 12.8		Kochab	137 20.6	N74 03.2				
	19	13 07.1	147 05.3	01.6	115 51.8	21.2		339 11.9	16.7		38 16.7	12.8		Markab	13 30.9	N15 20.1				
	20	28 09.5	162 04.8	02.4	130 52.3	21.4		354 14.5	16.7		53 18.9	12.7		Menkar	314 06.8	N 4 11.0				
	21	43 12.0	177 04.3	03.3	145 52.8	21.6		9 17.1	16.7		68 21.2	12.6		Menkent	147 58.9	S36 29.1				
	22	58 14.5	192 03.8	04.2	160 53.3	21.8		24 19.6	16.6		83 23.5	12.6		Miaplacidus	221 37.9	S69 48.6				
	23	73 16.9	207 03.3	05.0	175 53.7	21.9		39 22.2	16.6		98 25.8	12.5								
WEDNESDAY	2000	88 19.4	222 02.8	S15 05.9	190 54.2	S23 22.1		54 24.7	N12 16.6		113 28.1	S12 12.4		Mirfak	308 29.1	N49 56.9				
	01	103 21.9	237 02.2	06.7	205 54.7	22.3		69 27.3	16.6		128 30.4	12.3		Nunki	75 49.2	S26 16.1				
	02	118 24.3	252 01.7	07.6	220 55.2	22.5		84 29.9	16.6		143 32.7	12.3		Peacock	53 07.6	S56 39.7				
	03	133 26.8	267 01.2	08.4	235 55.7	22.7		99 32.4	16.5		158 35.0	12.2		Pollux	243 18.1	N27 58.0				
	04	148 29.3	282 00.7	09.3	250 56.1	22.9		114 35.0	16.5		173 37.3	12.1		Procyon	244 51.5	N 5 09.8				
	05	163 31.7	297 00.2	10.1	265 56.6	23.0		129 37.5	16.5		188 39.5	12.1								
	06	178 34.2	311 59.7	S15 11.0	280 57.1	S23 23.2		144 40.1	N12 16.5		203 41.8	S12 12.0		Rasalhague	95 59.7	N12 32.5				
	07	193 36.6	326 59.1	11.9	295 57.6	23.4		159 42.7	16.5		218 44.1	11.9		Regulus	207 35.2	N11 51.0				
	08	208 39.1	341 58.6	12.7	310 58.1	23.6		174 45.2	16.4		233 46.4	11.9		Rigel	281 04.4	S 8 10.4				
	09	223 41.6	356 58.1	13.6	325 58.5	23.8		189 47.8	16.4		248 48.7	11.8		Rigel Kent.	139 42.0	S60 55.8				
	10	238 44.0	11 57.6	14.4	340 59.0	23.9		204 50.3	16.4		263 51.0	11.7		Sabik	102 04.2	S15 45.3				
	11	253 46.5	26 57.1	15.3	355 59.5	24.1		219 52.9	16.4		278 53.3	11.6								
	12	268 49.0	41 56.5	S15 16.1	11 00.0	S23 24.3		234 55.4	N12 16.4		293 55.6	S12 11.6		Schedar	349 31.9	N56 40.4				
	13	283 51.4	56 56.0	17.0	26 00.4	24.5		249 58.0	16.3		308 57.9	11.5		Shaula	96 12.0	S37 07.2				
	14	298 53.9	71 55.5	17.8	41 00.9	24.6		265 00.6	16.3		324 00.1	11.4		Sirius	258 26.7	S16 44.9				
	15	313 56.4	86 55.0	18.7	56 01.4	24.8		280 03.1	16.3		339 02.4	11.4		Spica	158 23.4	S11 17.1				
	16	328 58.8	101 54.4	19.5	71 01.9	25.0		295 05.7	16.3		354 04.7	11.3		Suhail	222 46.7	S43 31.5				
	17	344 0																		

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise							
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	18	19	20	21		
d h	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	° / ' "	°	h m	h m	h m	h m	h m	h m	h m	h m			
MONDAY	180	56.8	S23	22.3	110	31.9	10.0	S14	15.6	14.9	59.5	N 72	08 24	10 55	13 32	12 50	12 14	11 37		
	195	56.4		22.3	125	00.9	10.0		14	00.7	15.0	68	08 04	09 53	13 15	12 43	12 16	11 48		
	210	56.1		22.4	139	29.9	10.2		13	45.7	15.0	66	07 48	09 17	13 01	12 38	12 18	11 58		
	225	55.8		22.5	153	59.1	10.2		13	30.7	15.1	64	07 35	08 52	12 49	12 34	12 20	12 05		
	240	55.5		22.6	168	28.3	10.3		13	15.6	15.2	62	07 24	08 32	12 40	12 30	12 21	12 12		
	255	55.2		22.7	182	57.6	10.4		13	00.4	15.2	60	07 14	08 16	12 31	12 27	12 22	12 18		
	270	54.9	S23	22.7	197	27.0	10.5	S12	45.2	15.3	59.5	60	07 06	08 03	12 24	12 24	12 23	12 23		
	285	54.6		22.8	211	56.5	10.5		12	29.9	15.4	58	06 58	07 51	12 18	12 21	12 24	12 28		
	300	54.3		22.9	226	26.0	10.6		12	14.5	15.4	54	06 52	07 41	12 12	12 19	12 25	12 32		
	315	54.0		23.0	240	55.6	10.7		11	59.1	15.5	52	06 45	07 32	12 07	12 17	12 26	12 35		
	330	53.7		23.0	255	25.3	10.8		11	43.6	15.5	50	06 40	07 23	12 02	12 15	12 27	12 39		
	345	53.4		23.1	269	55.1	10.8		11	28.1	15.6	45	06 34	07 16	11 58	12 13	12 27	12 42		
	0	53.1	S23	23.2	284	24.9	10.9	S11	12.5	15.7	59.4	45	06 23	07 00	11 49	12 10	12 29	12 48		
	13	15	52.8		23.3	298	54.8	11.0		10	56.8	15.7	N 40	06 12	06 46	11 41	12 06	12 30	12 54	
	14	30	52.5		23.3	313	24.8	11.0		10	41.1	15.7	35	06 03	06 35	11 34	12 04	12 31	12 59	
	15	45	52.1		23.4	327	54.8	11.1		10	25.4	15.8	30	05 54	06 24	11 29	12 01	12 32	13 03	
	16	60	51.8		23.5	342	24.9	11.2		10	09.6	15.9	20	05 38	06 05	11 18	11 57	12 34	13 11	
	17	75	51.5		23.5	356	55.1	11.2		9	53.7	15.8	N 10	05 21	05 48	11 09	11 53	12 35	13 17	
	18	90	51.2	S23	23.6	11	25.3	11.3	S 9	37.9	16.0	59.4	0	05 04	05 31	11 01	11 50	12 37	13 24	
	19	105	50.9		23.7	25	55.6	11.3		9	21.9	16.0	S 10	04 45	05 13	10 52	11 46	12 38	13 30	
	20	120	50.6		23.7	40	25.9	11.4		9	05.9	16.0	20	04 23	04 52	10 43	11 42	12 40	13 37	
	21	135	50.3		23.8	54	56.3	11.5		8	49.9	16.0	30	03 54	04 27	10 33	11 38	12 42	13 45	
	22	150	50.0		23.9	69	26.8	11.5		8	33.9	16.1	35	03 35	04 12	10 27	11 36	12 43	13 50	
	23	165	49.7		23.9	83	57.3	11.6		8	17.8	16.2	45	03 12	03 54	10 20	11 33	12 44	13 55	
	TUESDAY	00	180	49.4	S23	24.0	98	27.9	11.6	S 8	01.6	16.1	59.3	S 50	01 56	03 01	03 46	10 02	11 26	12 47
01		195	49.1		24.0	112	58.5	11.7		7	45.5	16.2	52	01 28	02 46	03 35	09 58	11 24	12 48	14 12
02		210	48.8		24.1	127	29.2	11.7		7	29.3	16.3	54	00 41	02 28	03 23	09 53	11 22	12 49	14 16
03		225	48.5		24.2	141	59.9	11.8		7	13.0	16.2	56	////	02 06	03 08	09 47	11 20	12 50	14 20
04		240	48.1		24.2	156	30.7	11.9		6	56.8	16.3	58	////	01 36	02 52	09 41	11 17	12 51	14 25
05		255	47.8		24.3	171	01.6	11.9		6	40.5	16.3	S 60	////	00 46	02 31	09 34	11 15	12 52	14 30
06		270	47.5	S23	24.3	185	32.5	11.9	S 6	24.2	16.4	59.2	Lat.	Sunset	Twilight		Moonset			
07		285	47.2		24.4	200	03.4	12.0		6	07.8	16.4			Civil	Naut.	18	19	20	21
08		300	46.9		24.4	214	34.4	12.0		5	51.4	16.4					h m	h m	h m	h m
09		315	46.6		24.5	229	05.4	12.0		5	35.0	16.4	N 72	h m	h m	h m	h m	h m	h m	h m
10		330	46.3		24.6	243	36.4	12.1		5	18.6	16.4	72	12 59	15 30	21 26	23 52	26 12	02 12	
11		345	46.0		24.6	258	07.5	12.2		5	02.2	16.4	N 70	14 01	15 50	21 41	23 54	26 03	02 03	
12		0	45.7	S23	24.7	272	38.7	12.1	S 4	45.8	16.5	59.2	68	14 36	16 06	21 52	23 56	25 56	01 56	
13		15	45.4		24.7	287	09.8	12.3		4	29.3	16.5	66	13 21	15 02	22 02	23 58	25 51	01 51	
14		30	45.1		24.8	301	41.1	12.2		4	12.8	16.5	64	14 03	15 21	22 09	23 59	25 46	01 46	
15		45	44.8		24.8	316	12.3	12.3		3	56.3	16.5	62	14 32	15 38	22 16	24 00	00 00	01 42	
16		60	44.4		24.9	330	43.6	12.3		3	39.8	16.5	60	14 53	15 51	22 22	24 01	00 01	01 38	
17		75	44.1		24.9	345	14.9	12.3		3	23.3	16.6	N 58	15 11	16 03	16 55	22 27	24 02	00 02	01 35
18		90	43.8	S23	25.0	359	46.2	12.4	S 3	06.7	16.5	59.1	56	15 26	16 13	17 02	22 31	24 03	00 03	01 33
19		105	43.5		25.0	14	17.6	12.4		2	50.2	16.6	54	15 38	16 22	17 08	22 35	24 04	00 04	01 30
20		120	43.2		25.0	28	49.0	12.4		2	33.6	16.5	52	15 49	16 30	17 14	22 39	24 04	00 04	01 28
21		135	42.9		25.1	43	20.4	12.5		2	17.1	16.6	50	15 59	16 38	17 19	22 42	24 05	00 05	01 26
22		150	42.6		25.1	57	51.9	12.5		2	00.5	16.5	45	16 20	16 54	17 31	22 49	24 06	00 06	01 22
23		165	42.3		25.2	72	23.4	12.5		1	44.0	16.6	N 40	16 37	17 07	17 42	22 55	24 07	00 07	01 18
WEDNESDAY		00	180	42.0	S23	25.2	86	54.9	12.5	S 1	27.4	16.5	59.0	35	16 51	17 19	17 51	23 00	24 08	00 08
	01	195	41.7		25.3	101	26.4	12.5		1	10.9	16.6	30	17 03	17 30	18 00	23 04	24 09	00 09	01 12
	02	210	41.4		25.3	115	57.9	12.6		0	54.3	16.6	20	17 25	17 49	18 16	23 12	24 10	00 10	01 07
	03	225	41.0		25.3	130	29.5	12.6		0	37.7	16.5	N 10	17 43	18 06	18 32	23 18	24 11	00 11	01 03
	04	240	40.7		25.4	145	01.1	12.5		0	21.2	16.6	0	18 01	18 23	18 49	23 24	24 12	00 12	00 59
	05	255	40.4		25.4	159	32.6	12.6	S 0	04.6	16.5	59.0	S 10	18 18	18 41	19 08	23 30	24 13	00 13	00 55
	06	270	40.1	S23	25.5	174	04.2	12.7	N 0	11.9	16.5	58.9	20	18 37	19 02	19 31	23 37	24 14	00 14	00 51
	07	285	39.8		25.5	188	35.9	12.6		0	28.4	16.6	30	18 59	19 27	20 00	23 44	24 15	00 15	00 46
	08	300	39.5		25.5	203	07.5	12.6		0	45.0	16.5	35	19 12	19 42	20 19	23 48	24 16	00 16	00 43
	09	315	39.2		25.6	217	39.1	12.7		1	01.5	16.5	40	19 27	20 00	20 42	23 52	24 17	00 17	00 40
	10	330	38.9		25.6	232	10.8	12.6		1	18.0	16.4	45	19 45	20 23	21 13	23 58	24 18	00 18	00 37
	11	345	38.6		25.6	246	42.4	12.7		1	34.4	16.5	S 50	20 08	20 53	21 58	24 04	00 04	00 19	00 33
	12	0	38.3	S23	25.7	261	14.1	12.6	N 1	50.9	16.5	58.9	52	20 19	21 08	22 26	24 07	00 07	00 19	00 31
	13	15	38.0		25.7	275	45.7	12.7		2	07.4	16.4	54	20 31	21 26	22 13	24 10	00 10	00 19	00 29
	14	30	37.6		25.7	290	17.4	12.7		2	23.8	16.4	56	20 46	21 48	////	00 05	00 13	00 20	00 26
	15	45	37.3		25.8	304	49.1	12.6		2	40.2	16.4	58	21 02	22 18	////	00 13	00 17	00 21	00 24
	16	60	37.0		25.8	319	20.7	12.7		2	56.6	16.4	S 60	21 23	23 09	////	00 21	00 21	00 21	00 21
	17	75	36.7		25.8	333	52.4	12.7		3	13.0	16.3								

UT		ARIES		VENUS -4.1		MARS +1.4		JUPITER -2.7		SATURN +0.9		STARS			
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
		° /	° /	° /	° /	° /	° /	° /	° /	° /	° /	° /		° /	° /
T H U R S D A Y	21 00	89 18.5	221 50.2	S15 26.3	191 05.7	S23 26.4	55 26.1	N12 16.2	114 23.0	S12 10.7	Acamar	315 12.1	S40 12.7		
	01	104 21.0	236 49.7	27.1	206 06.2	26.6	70 28.7	16.1	129 25.3	10.7	Achernar	335 20.6	S57 07.2		
	02	119 23.5	251 49.2	28.0	221 06.6	26.8	85 31.2	16.1	144 27.6	10.6	Acrux	173 01.2	S63 13.6		
	03	134 25.9	266 48.6	. . 28.8	236 07.1	. . 26.9	100 33.8	. . 16.1	159 29.9	. . 10.5	Adhara	255 06.2	S29 00.2		
	04	149 28.4	281 48.1	29.7	251 07.6	27.1	115 36.3	16.1	174 32.2	10.4	Aldebaran	290 40.3	N16 33.5		
	05	164 30.9	296 47.6	30.5	266 08.1	27.3	130 38.9	16.1	189 34.5	10.4					
	06	179 33.3	311 47.0	S15 31.3	281 08.5	S23 27.4	145 41.4	N12 16.1	204 36.7	S12 10.3	Alioth	166 13.9	N55 49.5		
	07	194 35.8	326 46.5	32.2	296 09.0	27.6	160 44.0	16.0	219 39.0	10.2	Alkaid	152 52.9	N49 11.4		
	08	209 38.2	341 46.0	33.0	311 09.5	27.8	175 46.5	16.0	234 41.3	10.2	Alnair	27 34.2	S46 51.0		
	09	224 40.7	356 45.4	. . 33.9	326 10.0	. . 27.9	190 49.1	. . 16.0	249 43.6	. . 10.1	Alnilam	275 38.3	S 1 11.1		
	10	239 43.2	11 44.9	34.7	341 10.4	28.1	205 51.6	16.0	264 45.9	10.0	Alphard	217 48.4	S 8 45.7		
	11	254 45.6	26 44.4	35.5	356 10.9	28.3	220 54.2	16.0	279 48.2	09.9					
	12	269 48.1	41 43.8	S15 36.4	11 11.4	S23 28.5	235 56.7	N12 16.0	294 50.5	S12 09.9	Alphecca	126 04.8	N26 37.9		
	13	284 50.6	56 43.3	37.2	26 11.8	28.6	250 59.3	15.9	309 52.7	09.8	Alpheratz	357 35.7	N29 13.5		
	14	299 53.0	71 42.8	38.0	41 12.3	28.8	266 01.8	15.9	324 55.0	09.7	Altair	62 01.1	N 8 55.9		
	15	314 55.5	86 42.2	. . 38.9	56 12.8	. . 29.0	281 04.4	. . 15.9	339 57.3	. . 09.7	Ankaa	353 08.0	S42 10.8		
	16	329 58.0	101 41.7	39.7	71 13.3	29.1	296 06.9	15.9	354 59.6	09.6	Antares	112 17.3	S26 29.0		
	17	345 00.4	116 41.2	40.5	86 13.7	29.3	311 09.4	15.9	10 01.9	09.5					
	18	0 02.9	131 40.6	S15 41.4	101 14.2	S23 29.5	326 12.0	N12 15.9	25 04.2	S12 09.4	Arcturus	145 48.9	N19 03.4		
	19	15 05.4	146 40.1	42.2	116 14.7	29.6	341 14.5	15.9	40 06.4	09.4	Atria	107 12.9	S69 04.1		
	20	30 07.8	161 39.5	43.0	131 15.2	29.8	356 17.1	15.8	55 08.7	09.3	Avior	234 14.6	S59 34.9		
	21	45 10.3	176 39.0	. . 43.9	146 15.6	. . 30.0	11 19.6	. . 15.8	70 11.0	. . 09.2	Bellatrix	278 23.5	N 6 22.3		
	22	60 12.7	191 38.5	44.7	161 16.1	30.1	26 22.2	15.8	85 13.3	09.2	Betelgeuse	270 52.7	N 7 24.7		
	23	75 15.2	206 37.9	45.5	176 16.6	30.3	41 24.7	15.8	100 15.6	09.1					
F R I D A Y	22 00	90 17.7	221 37.4	S15 46.4	191 17.0	S23 30.5	56 27.3	N12 15.8	115 17.9	S12 09.0	Canopus	263 52.2	S52 42.4		
	01	105 20.1	236 36.8	47.2	206 17.5	30.6	71 29.8	15.8	130 20.1	08.9	Capella	280 22.7	N46 01.4		
	02	120 22.6	251 36.3	48.0	221 18.0	30.8	86 32.4	15.8	145 22.4	08.9	Deneb	49 26.8	N45 22.0		
	03	135 25.1	266 35.8	. . 48.9	236 18.5	. . 30.9	101 34.9	. . 15.7	160 24.7	. . 08.8	Denebola	182 25.8	N14 26.2		
	04	150 27.5	281 35.2	49.7	251 18.9	31.1	116 37.4	15.7	175 27.0	08.7	Diphda	348 48.1	S17 51.4		
	05	165 30.0	296 34.7	50.5	266 19.4	31.3	131 40.0	15.7	190 29.3	08.6					
	06	180 32.5	311 34.1	S15 51.3	281 19.9	S23 31.4	146 42.5	N12 15.7	205 31.6	S12 08.6	Dubhe	193 41.9	N61 37.1		
	07	195 34.9	326 33.6	52.2	296 20.3	31.6	161 45.1	15.7	220 33.8	08.5	Elnath	278 02.6	N28 37.7		
	08	210 37.4	341 33.0	53.0	311 20.8	31.7	176 47.6	15.7	235 36.1	08.4	Eltanin	90 43.1	N51 29.1		
	09	225 39.8	356 32.5	. . 53.8	326 21.3	. . 31.9	191 50.2	. . 15.7	250 38.4	. . 08.4	Enif	33 39.9	N 9 59.1		
	10	240 42.3	11 31.9	54.6	341 21.7	32.1	206 52.7	15.6	265 40.7	08.3	Fomalhaut	15 15.6	S29 29.9		
	11	255 44.8	26 31.4	55.5	356 22.2	32.2	221 55.2	15.6	280 43.0	08.2					
	12	270 47.2	41 30.8	S15 56.3	11 22.7	S23 32.4	236 57.8	N12 15.6	295 45.3	S12 08.1	Gacrux	171 52.7	S57 14.5		
	13	285 49.7	56 30.3	57.1	26 23.2	32.5	252 00.3	15.6	310 47.5	08.1	Gienah	175 44.5	S17 40.4		
	14	300 52.2	71 29.7	57.9	41 23.6	32.7	267 02.9	15.6	325 49.8	08.0	Hadar	148 37.6	S60 29.0		
	15	315 54.6	86 29.2	. . 58.7	56 24.1	. . 32.9	282 05.4	. . 15.6	340 52.1	. . 07.9	Hamal	327 52.0	N23 34.6		
	16	330 57.1	101 28.6	15 59.6	71 24.6	33.0	297 07.9	15.6	355 54.4	07.8	Kaus Aust.	83 34.1	S34 22.4		
	17	345 59.6	116 28.1	16 00.4	86 25.0	33.2	312 10.5	15.6	10 56.7	07.8					
	18	1 02.0	131 27.5	S16 01.2	101 25.5	S23 33.3	327 13.0	N12 15.5	25 58.9	S12 07.7	Kochab	137 20.6	N74 03.1		
	19	16 04.5	146 27.0	02.0	116 26.0	33.5	342 15.6	15.5	41 01.2	07.6	Markab	13 30.9	N15 20.1		
	20	31 07.0	161 26.4	02.8	131 26.4	33.6	357 18.1	15.5	56 03.5	07.6	Menkar	314 06.8	N 4 11.0		
	21	46 09.4	176 25.9	. . 03.7	146 26.9	. . 33.8	12 20.6	. . 15.5	71 05.8	. . 07.5	Menkent	147 58.9	S36 29.1		
	22	61 11.9	191 25.3	04.5	161 27.4	34.0	27 23.2	15.5	86 08.1	07.4	Miaplacidus	221 37.8	S69 48.6		
	23	76 14.3	206 24.8	05.3	176 27.8	34.1	42 25.7	15.5	101 10.4	07.3					
S A T U R D A Y	23 00	91 16.8	221 24.2	S16 06.1	191 28.3	S23 34.3	57 28.2	N12 15.5	116 12.6	S12 07.3	Mirfak	308 29.1	N49 56.9		
	01	106 19.3	236 23.7	06.9	206 28.8	34.4	72 30.8	15.5	131 14.9	07.2	Nunki	75 49.2	S26 16.1		
	02	121 21.7	251 23.1	07.7	221 29.2	34.6	87 33.3	15.5	146 17.2	07.1	Peacock	53 07.6	S56 39.7		
	03	136 24.2	266 22.6	. . 08.6	236 29.7	. . 34.7	102 35.8	. . 15.4	161 19.5	. . 07.0	Pollux	243 18.0	N27 58.0		
	04	151 26.7	281 22.0	09.4	251 30.2	34.9	117 38.4	15.4	176 21.8	07.0	Procyon	244 51.4	N 5 09.8		
	05	166 29.1	296 21.4	10.2	266 30.6	35.0	132 40.9	15.4	191 24.0	06.9					
	06	181 31.6	311 20.9	S16 11.0	281 31.1	S23 35.2	147 43.4	N12 15.4	206 26.3	S12 06.8	Rasalhague	95 59.7	N12 32.5		
	07	196 34.1	326 20.3	11.8	296 31.6	35.3	162 46.0	15.4	221 28.6	06.7	Regulus	207 35.2	N11 51.0		
	08	211 36.5	341 19.8	12.6	311 32.0	35.5	177 48.5	15.4	236 30.9	06.7	Rigel	281 04.4	S 8 10.4		
	09	226 39.0	356 19.2	. . 13.4	326 32.5	. . 35.6	192 51.0	. . 15.4	251 33.2	. . 06.6	Rigil Kent.	139 42.0	S60 55.8		
	10	241 41.5	11 18.7	14.2	341 33.0	35.8	207 53.6	15.4	266 35.4	06.5	Sabik	102 04.1	S15 45.3		
	11	256 43.9	26 18.1	15.0	356 33.4	35.9	222 56.1	15.4	281 37.7	06.5					
	12	271 46.4	41 17.5	S16 15.8	11 33.9	S23 36.1	237 58.6	N12 15.3	296 40.0	S12 06.4	Schedar	349 32.0	N56 40.4		
	13	286 48.8	56 17.0	16.7	26 34.4	36.2	253 01.2	15.3	311 42.3	06.3	Shaula	96 12.0	S37 07.2		
	14	301 51.3	71 16.4	17.5	41 34.8	36.4	268 03.7	15.3	326 44.5	06.2	Sirius	258 26.7	S16 44.9		
	15	316 53.8	86 15.9	. . 18.3	56 35.3	. . 36.5	283 06.2	. . 15.3	341 46.8	. . 06.2	Spica	158 23.4	S11 17.1		
	16	331 56.2	101 15.3	19.1	71 35.8	36.7	298 08.8	15.3	356 49.1	06.1	Suhail	222 46.6	S43 31.5		
	17	346 58.7	116 14.7	19.9	86 36.2	36.8	313 11.3	15.3	11 51.4	06.0					
	18	2 01.2	131 14.2	S16 20.7	101 36.7	S23 37.0	328 13.8	N12 15.3	26 53.7	S12 05.9	Vega	80 34.3	N38 48.3		
	19	17 03.6	146 13.6	21.5	116 37.2	37.1	343 16.4	15.3	41 55.9	05.9	Zuben'ubi	136 57.2	S16 08.4		
	20	32 06.1	161 13.0	22.3	131 37.6	37.3	358 18.9	15.3	56 58.2	05.8					
	21	47 08.6	176 12.5	. . 23.1	146 38.1	. . 37.4	13 21.4	. . 15.3	72 00.5	. . 05.7					
	22	62 11.0	191 11.9	23.9	161 38.6	37.5	28 23.9	15.3	87 02.8	05.6					
	23	77 13.5	206 11.3	24.7	176 39.0	37.7	43 26.5	15.2	102 05.0	05.6					
		h m													
Mer. Pass. 17		55.9	v -0.5	d 0.8	v 0.5	d 0.2	v 2.5	d 0.0	v 2.3	d 0.1					
													SHA	Mer. Pass.	
													° /	h m	
													° /	h m	

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise												
	GHA		Dec		GHA		v	Dec		d	HP		Naut.	Civil	21	22	23	24							
	°	'			°	'																			
21 T H U R S D A Y	d	h	°	'	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m			
	00	180	34.5	S23	26.0	75	33.9	12.6	N	5	06.9	16.1	58.7	N 72	08 26	10 58	██	11 37	10 47	□	□				
	01	195	34.2		26.0	90	05.5	12.6		5	23.0	16.2	58.7	N 70	08 06	09 55	██	11 48	11 13	10 06	□				
	02	210	33.9		26.0	104	37.1	12.6		5	39.2	16.0	58.7	68	07 50	09 19	██	11 58	11 33	10 55	□				
	03	225	33.6		26.1	119	08.7	12.6		5	55.2	16.1	58.6	66	07 37	08 54	10 35	12 05	11 49	11 27	10 38				
	04	240	33.3		26.1	133	40.3	12.5		6	11.3	16.0	58.6	64	07 26	08 34	09 52	12 12	12 02	11 51	11 32				
	05	255	33.0		26.1	148	11.8	12.6		6	27.3	16.0	58.6	62	07 16	08 18	09 24	12 18	12 14	12 09	12 05				
	06	270	32.7	S23	26.1	162	43.4	12.5	N	6	43.3	15.9	58.6	60	07 08	08 04	09 02	12 23	12 23	12 25	12 30				
	07	285	32.4		26.1	177	14.9	12.5		6	59.2	15.9	58.6	N 58	07 00	07 53	08 45	12 28	12 32	12 38	12 49				
	08	300	32.1		26.1	191	46.4	12.4		7	15.1	15.9	58.6	56	06 53	07 43	08 30	12 32	12 40	12 50	13 06				
	09	315	31.8		26.2	206	17.8	12.5		7	31.0	15.8	58.5	54	06 47	07 33	08 17	12 35	12 46	13 00	13 20				
	10	330	31.4		26.2	220	49.3	12.4		7	46.8	15.7	58.5	52	06 41	07 25	08 06	12 39	12 52	13 09	13 32				
	11	345	31.1		26.2	235	20.7	12.4		8	02.5	15.7	58.5	50	06 36	07 18	07 56	12 42	12 58	13 17	13 43				
	12	0	30.8	S23	26.2	249	52.1	12.4	N	8	18.2	15.7	58.5	45	06 24	07 02	07 35	12 48	13 10	13 35	14 06				
	13	15	30.5		26.2	264	23.5	12.3		8	33.9	15.6	58.5	N 40	06 14	06 48	07 19	12 54	13 20	13 49	14 24				
	14	30	30.2		26.2	278	54.8	12.4		8	49.5	15.6	58.5	35	06 04	06 36	07 04	12 59	13 28	14 01	14 40				
	15	45	29.9		26.2	293	26.2	12.2		9	05.1	15.5	58.5	30	05 56	06 26	06 52	13 03	13 36	14 12	14 53				
	16	60	29.6		26.2	307	57.4	12.3		9	20.6	15.4	58.4	20	05 39	06 07	06 31	13 11	13 49	14 31	15 16				
	17	75	29.3		26.3	322	28.7	12.2		9	36.0	15.4	58.4	N 10	05 23	05 49	06 12	13 17	14 01	14 47	15 36				
	18	90	29.0	S23	26.3	336	59.9	12.2	N	9	51.4	15.4	58.4	0	05 06	05 32	05 55	13 24	14 12	15 02	15 55				
	19	105	28.7		26.3	351	31.1	12.2		10	06.8	15.3	58.4	S 10	04 47	05 14	05 37	13 30	14 23	15 18	16 14				
	20	120	28.3		26.3	6	02.3	12.1		10	22.1	15.2	58.4	20	04 24	04 53	05 18	13 37	14 35	15 34	16 35				
	21	135	28.0		26.3	20	33.4	12.1		10	37.3	15.2	58.4	30	03 55	04 28	04 56	13 45	14 49	15 53	16 58				
	22	150	27.7		26.3	35	04.5	12.0		10	52.5	15.1	58.3	35	03 36	04 13	04 43	13 50	14 57	16 05	17 12				
	23	165	27.4		26.3	49	35.5	12.0		11	07.6	15.1	58.3	40	03 13	03 55	04 28	13 55	15 06	16 18	17 29				
24													45	02 42	03 32	04 10	14 01	15 17	16 33	17 48					
22 F R I D A Y	00	180	27.1	S23	26.3	64	06.5	12.0	N11	22.7	15.0	58.3	S 50	01 57	03 02	03 47	14 08	15 30	16 52	18 13					
	01	195	26.8		26.3	78	37.5	11.9		11	37.7	14.9	58.3	52	01 29	02 47	03 36	14 12	15 36	17 01	18 25				
	02	210	26.5		26.3	93	08.4	11.9		11	52.6	14.8	58.3	54	00 41	02 29	03 24	14 16	15 43	17 11	18 39				
	03	225	26.2		26.3	107	39.3	11.8		12	07.4	14.8	58.3	56	00 00	02 07	03 10	14 20	15 51	17 23	18 54				
	04	240	25.9		26.3	122	10.1	11.8		12	22.2	14.8	58.2	58	00 00	01 37	02 53	14 25	15 59	17 36	19 13				
	05	255	25.6		26.3	136	40.9	11.8		12	37.0	14.6	58.2	S 60	00 00	00 46	02 32	14 30	16 09	17 52	19 37				
	06	270	25.2	S23	26.3	151	11.7	11.7	N12	51.6	14.6	58.2	Lat.		Sunset		Twilight		Moonset						
	07	285	24.9		26.3	165	42.4	11.6		13	06.2	14.5	58.2					Civil		Naut.		21	22	23	24
	08	300	24.6		26.3	180	13.0	11.7		13	20.7	14.4	58.2									h m	h m	h m	h m
	09	315	24.3		26.3	194	43.7	11.5		13	35.1	14.4	58.2	N 72	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
	10	330	24.0		26.3	209	14.2	11.5		13	49.5	14.3	58.1	N 70	12 59	15 31	15 31	02 12	04 43	□	□				
	11	345	23.7		26.3	223	44.7	11.5		14	03.8	14.2	58.1	N 70	██	14 02	15 51	02 03	04 19	07 11	□				
	12	0	23.4	S23	26.3	238	15.2	11.4	N14	18.0	14.1	58.1	68	██	14 37	16 07	01 56	04 01	06 23	□					
	13	15	23.1		26.3	252	45.6	11.4		14	32.1	14.1	58.1	66	13 22	15 03	16 20	01 51	03 47	05 52	08 31				
	14	30	22.8		26.3	267	16.0	11.3		14	46.2	13.9	58.1	64	14 04	15 23	16 31	01 46	03 35	05 30	07 37				
	15	45	22.5		26.2	281	46.3	11.2		15	00.1	13.9	58.1	62	14 33	15 39	16 41	01 42	03 25	05 12	07 05				
	16	60	22.1		26.2	296	16.5	11.3		15	14.0	13.8	58.0	60	14 55	15 52	16 49	01 38	03 17	04 57	06 41				
	17	75	21.8		26.2	310	46.8	11.1		15	27.8	13.7	58.0	N 58	15 12	16 04	16 57	01 35	03 09	04 45	06 22				
	18	90	21.5	S23	26.2	325	16.9	11.1	N15	41.5	13.6	58.0	56	15 27	16 14	17 04	01 33	03 03	04 34	06 06					
	19	105	21.2		26.2	339	47.0	11.0		15	55.1	13.6	58.0	54	15 40	16 23	17 10	01 30	02 57	04 25	05 53				
	20	120	20.9		26.2	354	17.0	11.0		16	08.7	13.4	58.0	52	15 51	16 32	17 15	01 28	02 52	04 17	05 41				
	21	135	20.6		26.2	8	47.0	10.9		16	22.1	13.4	57.9	50	16 01	16 39	17 21	01 26	02 47	04 09	05 31				
	22	150	20.3		26.2	23	16.9	10.9		16	35.5	13.3	57.9	45	16 21	16 55	17 33	01 22	02 37	03 53	05 09				
	23	165	20.0		26.1	37	46.8	10.8		16	48.8	13.1	57.9	N 40	16 38	17 09	17 43	01 18	02 29	03 40	04 52				
	23 S A T U R D A Y	00	180	19.7	S23	26.1	52	16.6	10.8	N17	01.9	13.1	57.9	35	16 52	17 21	17 52	01 15	02 22	03 29	04 37				
01		195	19.3		26.1	66	46.4	10.6		17	15.0	13.0	57.9	30	17 05	17 31	18 01	01 12	02 15	03 20	04 25				
02		210	19.0		26.1	81	16.0	10.7		17	28.0	12.9	57.9	20	17 26	17 50	18 18	01 07	02 05	03 03	04 03				
03		225	18.7		26.1	95	45.7	10.5		17	40.9	12.8	57.8	N 10	17 45	18 08	18 34	01 03	01 55	02 49	03 45				
04		240	18.4		26.0	110	15.2	10.5		17	53.7	12.7	57.8	0	18 02	18 25	18 51	00 59	01 46	02 36	03 27				
05		255	18.1		26.0	124	44.7	10.5		18	06.4	12.5	57.8	S 10	18 20	18 43	19 10	00 55	01 38	02 22	03 10				
06		270	17.8	S23	26.0	139	14.2	10.4	N18	18.9	12.5	57.8	20	18 39	19 03	19 33	00 51	01 28	02 08	02 52					
07		285	17.5		26.0	153	43.6	10.3		18	31.4	12.4	57.8	30	19 01	19 28	20 02	00 46	01 18	01 52	02 31				
08		300	17.2		26.0	168	12.9	10.2		18	43.8	12.3	57.8	35	19 14	19 44	20 20	00 43	01 12	01 43	02 18				
09		315	16.9		25.9	182	42.1	10.2		19	08.3	12.0	57.7	40	19 29	20 02	20 44	00 40	01 05	01 32	02 04				
10		330	16.6		25.9	197	11.3	10.2		19	20.3	12.0	57.7	45	19 47	20 25	21 14	00 37	00 57	01 20	01 48				
11		345	16.2		25.9	211	40.5	10.0		19	32.3	11.8	57.7	S 50	20 10	20 54	22 00	00 33	00 48	01 05	01 27				
12		0	15.9	S23	25.9																				

UT	ARIES			VENUS -4.1			MARS +1.4			JUPITER -2.6			SATURN +0.9			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
SUNDAY	24 00	92 16.0	221 10.8 S16 25.5	191 39.5 S23 37.8	58 29.0 N12 15.2	117 07.3 S12 05.5	Acamar	315 12.1 S40 12.7										
	01	107 18.4	236 10.2 26.3	206 39.9 38.0	73 31.5 15.2	132 09.6 05.4	Achernar	335 20.6 S57 07.2										
	02	122 20.9	251 09.6 27.1	221 40.4 38.1	88 34.1 15.2	147 11.9 05.3	Acruhs	173 01.1 S63 13.6										
	03	137 23.3	266 09.1 27.9	236 40.9 38.3	103 36.6 15.2	162 14.2 05.3	Adhara	255 06.2 S29 00.2										
	04	152 25.8	281 08.5 28.7	251 41.3 38.4	118 39.1 15.2	177 16.4 05.2	Aldebaran	290 40.3 N16 33.5										
	05	167 28.3	296 07.9 29.5	266 41.8 38.5	133 41.6 15.2	192 18.7 05.1												
	06	182 30.7	311 07.4 S16 30.3	281 42.3 S23 38.7	148 44.2 N12 15.2	207 21.0 S12 05.0	Alioth	166 13.8 N55 49.5										
	07	197 33.2	326 06.8 31.1	296 42.7 38.8	163 46.7 15.2	222 23.3 05.0	Alkaid	152 52.9 N49 11.4										
	08	212 35.7	341 06.2 31.9	311 43.2 39.0	178 49.2 15.2	237 25.5 04.9	Alnair	27 34.3 S46 50.9										
	09	227 38.1	356 05.6 32.7	326 43.7 39.1	193 51.7 15.2	252 27.8 04.8	Alnilam	275 38.3 S 1 11.2										
	10	242 40.6	11 05.1 33.5	341 44.1 39.3	208 54.3 15.2	267 30.1 04.7	Alphard	217 48.4 S 8 45.7										
	11	257 43.1	26 04.5 34.3	356 44.6 39.4	223 56.8 15.2	282 32.4 04.7												
	12	272 45.5	41 03.9 S16 35.0	11 45.0 S23 39.5	238 59.3 N12 15.1	297 34.6 S12 04.6	Alphecca	126 04.8 N26 37.9										
	13	287 48.0	56 03.4 35.8	26 45.5 39.7	254 01.8 15.1	312 36.9 04.5	Alpheratz	357 35.7 N29 13.5										
	14	302 50.4	71 02.8 36.6	41 46.0 39.8	269 04.4 15.1	327 39.2 04.4	Altair	62 01.1 N 8 55.9										
	15	317 52.9	86 02.2 37.4	56 46.4 39.9	284 06.9 15.1	342 41.5 04.4	Ankaa	353 08.0 S42 10.8										
	16	332 55.4	101 01.6 38.2	71 46.9 40.1	299 09.4 15.1	357 43.8 04.3	Antares	112 17.3 S26 29.0										
	17	347 57.8	116 01.1 39.0	86 47.3 40.2	314 11.9 15.1	12 46.0 04.2												
	18	3 00.3	131 00.5 S16 39.8	101 47.8 S23 40.4	329 14.5 N12 15.1	27 48.3 S12 04.1	Arcturus	145 48.9 N19 03.4										
	19	18 02.8	145 59.9 40.6	116 48.3 40.5	344 17.0 15.1	42 50.6 04.1	Atria	107 12.8 S69 04.1										
	20	33 05.2	160 59.3 41.4	131 48.7 40.6	359 19.5 15.1	57 52.9 04.0	Avior	234 14.5 S59 34.9										
	21	48 07.7	175 58.7 42.1	146 49.2 40.8	14 22.0 15.1	72 55.1 03.9	Bellatrix	278 23.5 N 6 22.3										
	22	63 10.2	190 58.2 42.9	161 49.6 40.9	29 24.5 15.1	87 57.4 03.8	Betelgeuse	270 52.7 N 7 24.7										
	23	78 12.6	205 57.6 43.7	176 50.1 41.0	44 27.1 15.1	102 59.7 03.8												
MONDAY	25 00	93 15.1	220 57.0 S16 44.5	191 50.6 S23 41.2	59 29.6 N12 15.1	118 02.0 S12 03.7	Canopus	263 52.2 S52 42.4										
	01	108 17.6	235 56.4 45.3	206 51.0 41.3	74 32.1 15.1	133 04.2 03.6	Capella	280 22.7 N46 01.4										
	02	123 20.0	250 55.8 46.1	221 51.5 41.4	89 34.6 15.1	148 06.5 03.5	Deneb	49 26.8 N45 22.0										
	03	138 22.5	265 55.3 46.9	236 51.9 41.6	104 37.1 15.1	163 08.8 03.5	Denebola	182 25.8 N14 26.2										
	04	153 24.9	280 54.7 47.6	251 52.4 41.7	119 39.6 15.0	178 11.0 03.4	Diphda	348 48.1 S17 51.4										
	05	168 27.4	295 54.1 48.4	266 52.9 41.8	134 42.2 15.0	193 13.3 03.3												
	06	183 29.9	310 53.5 S16 49.2	281 53.3 S23 42.0	149 44.7 N12 15.0	208 15.6 S12 03.2	Dubhe	193 41.9 N61 37.0										
	07	198 32.3	325 52.9 50.0	296 53.8 42.1	164 47.2 15.0	223 17.9 03.2	Elnath	278 02.6 N28 37.7										
	08	213 34.8	340 52.3 50.8	311 54.2 42.2	179 49.7 15.0	238 20.1 03.1	Eltanin	90 43.1 N51 29.1										
	09	228 37.3	355 51.8 51.5	326 54.7 42.4	194 52.2 15.0	253 22.4 03.0	Enif	33 39.9 N 9 59.1										
	10	243 39.7	10 51.2 52.3	341 55.2 42.5	209 54.8 15.0	268 24.7 02.9	Fomalhaut	15 15.6 S29 29.9										
	11	258 42.2	25 50.6 53.1	356 55.6 42.6	224 57.3 15.0	283 27.0 02.8												
	12	273 44.7	40 50.0 S16 53.9	11 56.1 S23 42.7	239 59.8 N12 15.0	298 29.2 S12 02.8	Gacrux	171 52.7 S57 14.5										
	13	288 47.1	55 49.4 54.6	26 56.5 42.9	255 02.3 15.0	313 31.5 02.7	Gienah	175 44.5 S17 40.4										
	14	303 49.6	70 48.8 55.4	41 57.0 43.0	270 04.8 15.0	328 33.8 02.6	Hadar	148 37.6 S60 29.0										
	15	318 52.1	85 48.2 56.2	56 57.4 43.1	285 07.3 15.0	343 36.1 02.5	Hamal	327 52.0 N23 34.6										
	16	333 54.5	100 47.7 57.0	71 57.9 43.3	300 09.8 15.0	358 38.3 02.5	Kaus Aust.	83 34.1 S34 22.4										
	17	348 57.0	115 47.1 57.7	86 58.4 43.4	315 12.4 15.0	13 40.6 02.4												
	18	3 59.4	130 46.5 S16 58.5	101 58.8 S23 43.5	330 14.9 N12 15.0	28 42.9 S12 02.3	Kochab	137 20.6 N74 03.1										
	19	19 01.9	145 45.9 59.3	116 59.3 43.6	345 17.4 15.0	43 45.1 02.2	Markab	13 30.9 N15 20.1										
	20	34 04.4	160 45.3 60.1	131 59.7 43.8	0 19.9 15.0	58 47.4 02.2	Menkar	314 06.8 N 4 11.0										
	21	49 06.8	175 44.7 60.8	147 00.2 43.9	15 22.4 15.0	73 49.7 02.1	Menkent	147 58.9 S36 29.1										
	22	64 09.3	190 44.1 61.6	162 00.6 44.0	30 24.9 15.0	88 52.0 02.0	Miaplacidus	221 37.8 S69 48.6										
	23	79 11.8	205 43.5 62.4	177 01.1 44.1	45 27.4 15.0	103 54.2 01.9												
TUESDAY	26 00	94 14.2	220 42.9 S17 03.1	192 01.6 S23 44.3	60 29.9 N12 15.0	118 56.5 S12 01.9	Mirfak	308 29.1 N49 56.9										
	01	109 16.7	235 42.3 03.9	207 02.0 44.4	75 32.5 15.0	133 58.8 01.8	Nunki	75 49.2 S26 16.1										
	02	124 19.2	250 41.7 04.7	222 02.5 44.5	90 35.0 15.0	149 01.0 01.7	Peacock	53 07.6 S56 39.7										
	03	139 21.6	265 41.1 05.4	237 02.9 44.6	105 37.5 15.0	164 03.3 01.6	Pollux	243 18.0 N27 58.0										
	04	154 24.1	280 40.6 06.2	252 03.4 44.8	120 40.0 15.0	179 05.6 01.5	Procyon	244 51.4 N 5 09.8										
	05	169 26.6	295 40.0 07.0	267 03.8 44.9	135 42.5 15.0	194 07.9 01.5												
	06	184 29.0	310 39.4 S17 07.7	282 04.3 S23 45.0	150 45.0 N12 15.0	209 10.1 S12 01.4	Rasalhague	95 59.7 N12 32.5										
	07	199 31.5	325 38.8 08.5	297 04.7 45.1	165 47.5 15.0	224 12.4 01.3	Regulus	207 35.2 N11 51.0										
	08	214 33.9	340 38.2 09.3	312 05.2 45.2	180 50.0 15.0	239 14.7 01.2	Rigel	281 04.4 S 8 10.4										
	09	229 36.4	355 37.6 10.0	327 05.7 45.4	195 52.5 15.0	254 16.9 01.2	Rigel Kent.	139 41.9 S60 55.8										
	10	244 38.9	10 37.0 10.8	342 06.1 45.5	210 55.0 15.0	269 19.2 01.1	Sabik	102 04.1 S15 45.3										
	11	259 41.3	25 36.4 11.5	357 06.6 45.6	225 57.5 14.9	284 21.5 01.0												
	12	274 43.8	40 35.8 S17 12.3	12 07.0 S23 45.7	241 00.1 N12 14.9	299 23.8 S12 00.9	Schedar	349 32.0 N56 40.4										
	13	289 46.3	55 35.2 13.1	27 07.5 45.8	256 02.6 14.9	314 26.0 00.9	Shaula	96 12.0 S37 07.2										
	14	304 48.7	70 34.6 13.8	42 07.9 46.0	271 05.1 14.9	329 28.3 00.8	Sirius	258 26.7 S16 44.9										
	15	319 51.2	85 34.0 14.6	57 08.4 46.1	286 07.6 14.9	344 30.6 00.7	Spica	158 23.3 S11 17.1										
	16	334 53.7	100 33.4 15.3	72 08.8 46.2	301 10.1 14.9	359 32.8 00.6	Suhail	222 46.6 S43 31.5										
	17	349 56.1	115 32.8 16.1	87 09.3 46.3	316 12.6 14.9	14 35.1 00.5												
	18	4 58.6	130 32.2 S17 16.8	102 09.7 S23 46.4	331 15.1 N12 14.9	29 37.4 S12 00.5	Vega	80 34.3 N38 48.3										
	19	20 01.1	145 31.6 17.6	117 10.2 46.5	346 17.6 14.9	44 39.6 00.4	Zuben'ubi	136 57.2 S16 08.4										
	20	35 03.5	160 31.0 18.4	132 10.7 46.7	1 20.1 14.9	59 41.9 00.3												
	21	50 06.0	175 30.4 19.1	147 11.1 46.8	16 22.6 14.9	74 44.2 00.2												
	22	65 08.4	190 29.8 19.9	162 11.6 46.9	31 25.1 14.9	89 46.4 00.2	Venus	127 41.9 9 17										
	23	80 10.9	205 29.1 20.6	177 12.0 47.0	46 27.6 14.9	104 48.7 00.1	Mars	98 35.5 11 12										
		Mer.Pass. 17 44.1			v 2.5 d 0.0			v 2.3 d 0.1			Jupiter							
		v -0.6 d 0.8			v 0.5 d 0.1			v 2.3 d 0.1			Saturn							

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA		v	Dec			d	HP		Naut.	Civil	24	25	26	27			
	°	'		°	'		°	'											°	'	
SUNDAY	d	h	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m	
	24	00	180	12.2	S23	25.5	39	53.4	9.2	N21	46.9	10.4	57.5	N 72	08 27	10 57					
	01	195	11.9		25.4	54	21.6	9.2	21	57.3	10.4	57.4	68	08 07	09 55						
	02	210	11.6		25.4	68	49.8	9.1	22	07.7	10.2	57.4	66	07 38	08 55	10 35	10 38				
	03	225	11.3		25.4	83	17.9	9.1	22	17.9	10.0	57.4	64	07 27	08 35	09 53	11 32				
	04	240	11.0		25.3	97	46.0	8.9	22	27.9	9.9	57.4	62	07 17	08 19	09 25	12 05	12 01	11 54	13 04	
	05	255	10.7		25.3	112	13.9	9.0	22	37.8	9.9	57.4	60	07 09	08 06	09 03	12 30	12 41	13 09	14 10	
	06	270	10.4	S23	25.2	126	41.9	8.8	N22	47.7	9.6	57.3	N 58	07 01	07 54	08 46	12 49	13 09	13 45	14 45	
	07	285	10.0		25.2	141	09.7	8.8	22	57.3	9.6	57.3	56	06 55	07 44	08 31	13 06	13 31	14 11	15 10	
	08	300	09.7		25.2	155	37.5	8.8	23	06.9	9.4	57.3	54	06 48	07 35	08 18	13 20	13 48	14 31	15 30	
	09	315	09.4		25.1	170	05.3	8.7	23	16.3	9.3	57.3	52	06 43	07 26	08 07	13 32	14 04	14 48	15 47	
	10	330	09.1		25.1	184	33.0	8.6	23	25.6	9.1	57.3	50	06 37	07 19	07 57	13 43	14 17	15 03	16 02	
	11	345	08.8		25.0	199	00.6	8.5	23	34.7	9.0	57.2	45	06 26	07 03	07 37	14 06	14 44	15 33	16 31	
	12	0	08.5	S23	25.0	213	28.1	8.5	N23	43.7	8.9	57.2	N 40	06 15	06 49	07 20	14 24	15 06	15 56	16 54	
	13	15	08.2		24.9	227	55.6	8.5	23	52.6	8.7	57.2	35	06 06	06 38	07 06	14 40	15 24	16 16	17 13	
	14	30	07.9		24.9	242	23.1	8.4	24	01.3	8.6	57.2	30	05 57	06 27	06 53	14 53	15 40	16 32	17 29	
	15	45	07.6		24.8	256	50.5	8.3	24	09.9	8.5	57.2	20	05 41	06 08	06 32	15 16	16 06	17 00	17 57	
	16	60	07.3		24.8	271	17.8	8.3	24	18.4	8.3	57.1	N 10	05 24	05 51	06 14	15 36	16 29	17 24	18 20	
	17	75	06.9		24.7	285	45.1	8.2	24	26.7	8.2	57.1	0	05 07	05 34	05 56	15 55	16 50	17 47	18 42	
	18	90	06.6	S23	24.7	300	12.3	8.2	N24	34.9	8.0	57.1	S 10	04 48	05 16	05 39	16 14	17 12	18 09	19 04	
	19	105	06.3		24.6	314	39.5	8.1	24	42.9	7.9	57.1	20	04 26	04 55	05 20	16 35	17 35	18 33	19 28	
	20	120	06.0		24.6	329	06.6	8.0	24	50.8	7.7	57.1	30	03 57	04 30	04 58	16 58	18 02	19 02	19 55	
	21	135	05.7		24.5	343	33.6	8.1	24	58.5	7.6	57.0	35	03 38	04 15	04 45	17 12	18 18	19 18	20 11	
	22	150	05.4		24.5	358	00.7	7.9	25	06.1	7.5	57.0	40	03 15	03 57	04 29	17 29	18 37	19 38	20 30	
	23	165	05.1		24.4	12	27.6	7.9	25	13.6	7.3	57.0	45	02 44	03 34	04 11	17 48	18 59	20 01	20 53	
MONDAY	25	00	180	04.8	S23	24.4	26	54.5	7.9	N25	20.9	7.1	57.0	S 50	01 59	03 04	03 49	18 13	19 28	20 32	21 21
	01	195	04.5		24.3	41	21.4	7.8	25	28.0	7.0	57.0	52	01 31	02 49	03 38	18 25	19 42	20 47	21 35	
	02	210	04.2		24.3	55	48.2	7.8	25	35.0	6.9	56.9	54	00 44	02 31	03 26	18 39	19 59	21 05	21 52	
	03	225	03.9		24.2	70	15.0	7.7	25	41.9	6.7	56.9	56	///	02 09	03 11	18 54	20 19	21 26	22 11	
	04	240	03.5		24.1	84	41.7	7.7	25	48.6	6.6	56.9	58	///	01 39	02 55	19 13	20 43	21 53	22 35	
	05	255	03.2		24.1	99	08.4	7.6	25	55.2	6.4	56.9	S 60	///	00 48	02 34	19 37	21 17	22 31	23 07	
	06	270	02.9	S23	24.0	113	35.0	7.6	N26	01.6	6.2	56.9	Lat.	Sunset	Twilight		Moonset				
	07	285	02.6	24.0	128	01.6	7.6	26	07.8	6.2	56.8	Civil			Naut.	24	25	26	27		
	08	300	02.3		23.9	142	28.2	7.5	26	14.0	5.9	56.8	°	h	m	h	m	h	m	h	m
	09	315	02.0		23.8	156	54.7	7.5	26	19.9	5.8	56.8									
	10	330	01.7		23.8	171	21.2	7.5	26	25.7	5.6	56.8	N 70		14 05	15 53					
	11	345	01.4		23.7	185	47.7	7.4	26	31.3	5.5	56.8	68		14 40	16 09					
	12	0	01.1	S23	23.6	200	14.1	7.4	N26	36.8	5.4	56.7	66	13 25	15 05	16 22	08 31				
	13	15	00.8		23.6	214	40.5	7.3	26	42.2	5.1	56.7	64	14 07	15 25	16 33	07 37				
	14	30	00.5		23.5	229	06.8	7.3	26	47.3	5.1	56.7	62	14 35	15 41	16 43	07 05	09 04	11 08	11 55	
	15	45	00.1		23.4	243	33.1	7.3	26	52.4	4.8	56.7	60	14 57	15 54	16 51	06 41	08 24	09 53	10 48	
	16	59	59.8		23.4	257	59.4	7.3	26	57.2	4.7	56.7	N 58	15 14	16 06	16 59	06 22	07 56	09 17	10 14	
	17	74	59.5		23.3	272	25.7	7.3	27	01.9	4.6	56.6	56	15 29	16 16	17 05	06 06	07 35	08 52	09 48	
	18	89	59.2	S23	23.2	286	52.0	7.2	N27	06.5	4.4	56.6	54	15 41	16 25	17 12	05 53	07 17	08 31	09 28	
	19	104	58.9		23.2	301	18.2	7.2	27	10.9	4.2	56.6	52	15 53	16 33	17 17	05 41	07 02	08 14	09 11	
	20	119	58.6		23.1	315	44.4	7.2	27	15.1	4.1	56.6	50	16 02	16 41	17 23	05 31	06 49	08 00	08 56	
	21	134	58.3		23.0	330	10.6	7.1	27	19.2	3.9	56.5	45	16 23	16 57	17 34	05 09	06 23	07 30	08 27	
	22	149	58.0		22.9	344	36.7	7.2	27	23.1	3.7	56.5	N 40	16 40	17 11	17 45	04 52	06 02	07 07	08 04	
	23	164	57.7		22.9	359	02.9	7.1	27	26.8	3.6	56.5	35	16 54	17 22	17 54	04 37	05 44	06 48	07 44	
	TUESDAY	26	00	179	57.4	S23	22.8	13	29.0	7.1	N27	30.4	3.5	56.5	30	17 07	17 33	18 03	04 25	05 29	06 31
01		194	57.1		22.7	27	55.1	7.1	27	33.9	3.2	56.5	20	17 28	17 52	18 19	04 03	05 04	06 03	07 00	
02		209	56.8		22.6	42	21.2	7.1	27	37.1	3.1	56.4	N 10	17 46	18 09	18 35	03 45	04 42	05 40	06 36	
03		224	56.4		22.6	56	47.3	7.1	27	40.2	3.0	56.4	0	18 04	18 26	18 52	03 27	04 21	05 18	06 14	
04		239	56.1		22.5	71	13.4	7.1	27	43.2	2.8	56.4	S 10	18 21	18 44	19 11	03 10	04 01	04 55	05 51	
05		254	55.8		22.4	85	39.5	7.1	27	46.0	2.6	56.4	20	18 40	19 05	19 34	02 52	03 39	04 32	05 27	
06		269	55.5	S23	22.3	100	05.6	7.0	N27	48.6	2.5	56.4	30	19 02	19 30	20 03	02 31	03 14	04 04	04 59	
07		284	55.2		22.2	114	31.6	7.1	27	51.1	2.3	56.3	35	19 15	19 45	20 22	02 18	03 00	03 48	04 42	
08		299	54.9		22.2	128	57.7	7.1	27	53.4	2.1	56.3	40	19 30	20 03	20 45	02 04	02 42	03 29	04 23	
09		314	54.6		22.1	143	23.8	7.1	27	55.5	2.0	56.3	45	19 48	20 26	21 15	01 48	02 22	03 06	03 59	
10		329	54.3		22.0	157	49.9	7.1	27	57.5	1.8	56.3	S 50	20 11	20 55	22 01	01 27	01 56	02 36	03 29	
11		344	54.0		21.9	172	16.0	7.0	27	59.3	1.7	56.3	52	20 22	21 10	22 29	01 18	01 44	02 22	03 14	
12		359	53.7	S23	21.8	186	42.0	7.1	N28	01.0	1.5	56.2	54	20 34	21 28	23 15	01 07	01 30	02 05	02 56	
13		14	53.4		21.7	201	08.1	7.2	28	02.5	1.3	56.2	56	20 48	21 51	///	00 54	01 14	01 45	02 35	
14		29	53.1		21.7	215	34.3	7.1	28	03.8	1.2	56.2									

UT	ARIES		VENUS -4.1		MARS +1.4		JUPITER -2.6		SATURN +0.9		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
WEDNESDAY	127 00	95 13.4	220 28.5	S17 21.4	192 12.5	S23 47.1	61 30.1	N12 14.9	119 51.0	S12 00.0	Acamar	315 12.1	S40 12.7
	01	110 15.8	235 27.9	22.1	207 12.9	47.2	76 32.6	14.9	134 53.3	11 59.9	Achernar	335 20.6	S57 07.2
	02	125 18.3	250 27.3	22.9	222 13.4	47.3	91 35.1	14.9	149 55.5	59.8	Acrux	173 01.1	S63 13.6
	03	140 20.8	265 26.7	23.6	237 13.8	47.4	106 37.6	14.9	164 57.8	59.8	Adhara	255 06.2	S29 00.2
	04	155 23.2	280 26.1	24.4	252 14.3	47.6	121 40.1	14.9	180 00.1	59.7	Aldebaran	290 40.3	N16 33.5
	05	170 25.7	295 25.5	25.1	267 14.7	47.7	136 42.6	14.9	195 02.3	59.6			
	06	185 28.2	310 24.9	S17 25.9	282 15.2	S23 47.8	151 45.1	N12 14.9	210 04.6	S11 59.5	Alioth	166 13.8	N55 49.5
	07	200 30.6	325 24.3	26.6	297 15.6	47.9	166 47.6	14.9	225 06.9	59.5	Alkaid	152 52.9	N49 11.4
	08	215 33.1	340 23.7	27.4	312 16.1	48.0	181 50.1	14.9	240 09.1	59.4	Alnair	27 34.3	S46 50.9
	09	230 35.6	355 23.1	28.1	327 16.5	48.1	196 52.6	14.9	255 11.4	59.3	Alnilam	275 38.3	S 1 11.2
	10	245 38.0	10 22.5	28.8	342 17.0	48.2	211 55.1	15.0	270 13.7	59.2	Alphard	217 48.4	S 8 45.7
	11	260 40.5	25 21.8	29.6	357 17.4	48.3	226 57.6	15.0	285 15.9	59.1			
	12	275 42.9	40 21.2	S17 30.3	12 17.9	S23 48.4	242 00.1	N12 15.0	300 18.2	S11 59.1	Alphecca	126 04.8	N26 37.9
	13	290 45.4	55 20.6	31.1	27 18.3	48.6	257 02.6	15.0	315 20.5	59.0	Alpheratz	357 35.7	N29 13.5
	14	305 47.9	70 20.0	31.8	42 18.8	48.7	272 05.1	15.0	330 22.7	58.9	Altair	62 01.1	N 8 55.9
	15	320 50.3	85 19.4	32.6	57 19.2	48.8	287 07.6	15.0	345 25.0	58.8	Ankaa	353 08.0	S42 10.8
	16	335 52.8	100 18.8	33.3	72 19.7	48.9	302 10.1	15.0	0 27.3	58.7	Antares	112 17.2	S26 29.0
	17	350 55.3	115 18.2	34.0	87 20.1	49.0	317 12.6	15.0	15 29.5	58.7			
	18	5 57.7	130 17.5	S17 34.8	102 20.6	S23 49.1	332 15.1	N12 15.0	30 31.8	S11 58.6	Arcturus	145 48.9	N19 03.3
	19	21 00.2	145 16.9	35.5	117 21.0	49.2	347 17.6	15.0	45 34.1	58.5	Atria	107 12.8	S69 04.1
	20	36 02.7	160 16.3	36.3	132 21.5	49.3	2 20.1	15.0	60 36.3	58.4	Avior	234 14.5	S59 35.0
	21	51 05.1	175 15.7	37.0	147 21.9	49.4	17 22.6	15.0	75 38.6	58.4	Bellatrix	278 23.5	N 6 22.3
	22	66 07.6	190 15.1	37.7	162 22.4	49.5	32 25.1	15.0	90 40.9	58.3	Betelgeuse	270 52.7	N 7 24.7
	23	81 10.1	205 14.5	38.5	177 22.8	49.6	47 27.6	15.0	105 43.1	58.2			
THURSDAY	128 00	96 12.5	220 13.8	S17 39.2	192 23.3	S23 49.7	62 30.1	N12 15.0	120 45.4	S11 58.1	Canopus	263 52.2	S52 42.5
	01	111 15.0	235 13.2	39.9	207 23.7	49.8	77 32.6	15.0	135 47.7	58.0	Capella	280 22.7	N46 01.4
	02	126 17.4	250 12.6	40.7	222 24.2	49.9	92 35.1	15.0	150 49.9	58.0	Deneb	49 26.8	N45 22.0
	03	141 19.9	265 12.0	41.4	237 24.6	50.0	107 37.6	15.0	165 52.2	57.9	Denebola	182 25.8	N14 26.2
	04	156 22.4	280 11.4	42.1	252 25.1	50.1	122 40.1	15.0	180 54.5	57.8	Diphda	348 48.1	S17 51.5
	05	171 24.8	295 10.7	42.9	267 25.5	50.2	137 42.5	15.0	195 56.7	57.7			
	06	186 27.3	310 10.1	S17 43.6	282 26.0	S23 50.3	152 45.0	N12 15.0	210 59.0	S11 57.6	Dubhe	193 41.8	N61 37.0
	07	201 29.8	325 09.5	44.3	297 26.4	50.4	167 47.5	15.0	226 01.3	57.6	Einath	278 02.6	N28 37.7
	08	216 32.2	340 08.9	45.0	312 26.9	50.5	182 50.0	15.0	241 03.5	57.5	Eltanin	90 43.1	N51 29.0
	09	231 34.7	355 08.3	45.8	327 27.3	50.6	197 52.5	15.0	256 05.8	57.4	Enif	33 39.9	N 9 59.1
	10	246 37.2	10 07.6	46.5	342 27.8	50.7	212 55.0	15.0	271 08.1	57.3	Fomalhaut	15 15.6	S29 29.9
	11	261 39.6	25 07.0	47.2	357 28.2	50.8	227 57.5	15.0	286 10.3	57.2			
	12	276 42.1	40 06.4	S17 47.9	12 28.7	S23 50.9	243 00.0	N12 15.0	301 12.6	S11 57.2	Gacrux	171 52.6	S57 14.5
	13	291 44.6	55 05.8	48.7	27 29.1	51.0	258 02.5	15.0	316 14.8	57.1	Gienah	175 44.5	S17 40.4
	14	306 47.0	70 05.1	49.4	42 29.6	51.1	273 05.0	15.0	331 17.1	57.0	Hadar	148 37.5	S60 29.0
	15	321 49.5	85 04.5	50.1	57 30.0	51.2	288 07.5	15.0	346 19.4	56.9	Hamal	327 52.0	N23 34.6
	16	336 51.9	100 03.9	50.8	72 30.5	51.3	303 09.9	15.0	1 21.6	56.9	Kaus Aust.	83 34.1	S34 22.4
	17	351 54.4	115 03.3	51.6	87 30.9	51.4	318 12.4	15.1	16 23.9	56.8			
	18	6 56.9	130 02.6	S17 52.3	102 31.4	S23 51.5	333 14.9	N12 15.1	31 26.2	S11 56.7	Kochab	137 20.5	N74 03.1
	19	21 59.3	145 02.0	53.0	117 31.8	51.6	348 17.4	15.1	46 28.4	56.6	Markab	13 30.9	N15 20.1
	20	37 01.8	160 01.4	53.7	132 32.2	51.7	3 19.9	15.1	61 30.7	56.5	Menkar	314 06.8	N 4 11.0
	21	52 04.3	175 00.7	54.4	147 32.7	51.8	18 22.4	15.1	76 33.0	56.5	Menkent	147 58.8	S36 29.1
	22	67 06.7	190 00.1	55.2	162 33.1	51.9	33 24.9	15.1	91 35.2	56.4	Miaplacidus	221 37.7	S69 48.6
	23	82 09.2	204 59.5	55.9	177 33.6	52.0	48 27.4	15.1	106 37.5	56.3			
FRIDAY	129 00	97 11.7	219 58.8	S17 56.6	192 34.0	S23 52.1	63 29.8	N12 15.1	121 39.7	S11 56.2	Mirfak	308 29.1	N49 56.9
	01	112 14.1	234 58.2	57.3	207 34.5	52.2	78 32.3	15.1	136 42.0	56.1	Nunki	75 49.2	S26 16.1
	02	127 16.6	249 57.6	58.0	222 34.9	52.3	93 34.8	15.1	151 44.3	56.1	Peacock	53 07.6	S56 39.6
	03	142 19.0	264 56.9	58.7	237 35.4	52.4	108 37.3	15.1	166 46.5	56.0	Pollux	243 18.0	N27 58.0
	04	157 21.5	279 56.3	17 59.5	252 35.8	52.4	123 39.8	15.1	181 48.8	55.9	Procyon	244 51.4	N 5 09.8
	05	172 24.0	294 55.7	18 00.2	267 36.3	52.5	138 42.3	15.1	196 51.1	55.8			
	06	187 26.4	309 55.0	S18 00.9	282 36.7	S23 52.6	153 44.8	N12 15.1	211 53.3	S11 55.7	Rasalhague	95 59.7	N12 32.5
	07	202 28.9	324 54.4	01.6	297 37.2	52.7	168 47.2	15.1	226 55.6	55.7	Regulus	207 35.2	N11 51.0
	08	217 31.4	339 53.8	02.3	312 37.6	52.8	183 49.7	15.1	241 57.8	55.6	Rigel	281 04.4	S 8 10.4
	09	232 33.8	354 53.1	03.0	327 38.0	52.9	198 52.2	15.2	257 00.1	55.5	Rigel Kent.	139 41.9	S60 55.8
	10	247 36.3	9 52.5	03.7	342 38.5	53.0	213 54.7	15.2	272 02.4	55.4	Sabik	102 04.1	S15 45.3
	11	262 38.8	24 51.9	04.4	357 38.9	53.1	228 57.2	15.2	287 04.6	55.3			
	12	277 41.2	39 51.2	S18 05.1	12 39.4	S23 53.2	243 59.7	N12 15.2	302 06.9	S11 55.3	Schedar	349 32.0	N56 40.4
	13	292 43.7	54 50.6	05.8	27 39.8	53.3	259 02.1	15.2	317 09.2	55.2	Shaula	96 12.0	S37 07.2
	14	307 46.2	69 50.0	06.6	42 40.3	53.3	274 04.6	15.2	332 11.4	55.1	Sirius	258 26.6	S16 44.9
	15	322 48.6	84 49.3	07.3	57 40.7	53.4	289 07.1	15.2	347 13.7	55.0	Spica	158 23.3	S11 17.1
	16	337 51.1	99 48.7	08.0	72 41.2	53.5	304 09.6	15.2	2 15.9	54.9	Suhail	222 46.6	S43 31.6
	17	352 53.5	114 48.0	08.7	87 41.6	53.6	319 12.1	15.2	17 18.2	54.8			
	18	7 56.0	129 47.4	S18 09.4	102 42.0	S23 53.7	334 14.5	N12 15.2	32 20.5	S11 54.8	Vega	80 34.2	N38 48.3
	19	22 58.5	144 46.8	10.1	117 42.5	53.8	349 17.0	15.2	47 22.7	54.7	Zuben'ubi	136 57.2	S16 08.4
	20	38 00.9	159 46.1	10.8	132 42.9	53.9	4 19.5	15.2	62 25.0	54.6			
	21	53 03.4	174 45.5	11.5	147 43.4	53.9	19 22.0	15.2	77 27.2	54.5			
	22	68 05.9	189 44.8	12.2	162 43.8	54.0	34 24.5	15.3	92 29.5	54.4	Venus	124 01.3	9 19
	23	83 08.3	204 44.2	12.9	177 44.3	54.1	49 26.9	15.3	107 31.8	54.4	Mars	96 10.8	11 10
Mer. Pass. 17 32.3		v -0.6 d 0.7		v 0.4 d 0.1		v 2.5 d 0.0		v 2.3 d 0.1		SHA Mer. Pass. a / h m			
										Jupiter 326 17.6 19 47			
										Saturn 24 32.9 15 55			

UT	SUN				MOON				Lat.	Twilight		Sunrise	Moonrise								
	GHA		Dec	GHA		v	Dec	d		HP	Naut.		Civil	27	28	29	30				
	°	'		°	'																
WEDNESDAY	d h	°	'	°	'	°	'	°	'	°	'	h m	h m	h m	h m	h m	h m				
	27 00	179	50.0	S23	20.7	359	56.4	7.3	N28	08.4	0.5	56.0	N 72	08 27	10 53						
	01	194	49.7		20.6	14	22.7	7.4	28	07.9	0.5	56.0	68	07 51	09 54				16 25		
	02	209	49.4		20.6	28	49.1	7.4	28	07.4	0.8	55.9	66	07 38	08 55			15 29	17 48		
	03	224	49.1		20.5	43	15.5	7.5	28	06.6	0.9	55.9	64	07 27	08 35			16 19	18 12		
	04	239	48.8		20.4	57	42.0	7.4	28	05.7	1.0	55.9	62	07 18	08 20	09 25	13 04	15 01	16 50	18 30	
	05	254	48.4		20.3	72	08.4	7.6	28	04.7	1.2	55.9	60	07 09	08 06	09 04	14 10	15 38	17 13	18 45	
	06	269	48.1	S23	20.2	86	35.0	7.6	N28	03.5	1.4	55.9	N 58	07 02	07 55	08 46	14 45	16 05	17 32	18 58	
	07	284	47.8		20.1	101	01.6	7.6	28	02.1	1.5	55.8	56	06 55	07 44	08 32	15 10	16 25	17 47	19 09	
	08	299	47.5		20.0	115	28.2	7.6	28	00.6	1.7	55.8	54	06 49	07 35	08 19	15 30	16 43	18 00	19 19	
	09	314	47.2		19.9	129	54.8	7.7	27	58.9	1.8	55.8	52	06 44	07 27	08 08	15 47	16 57	18 12	19 27	
	10	329	46.9		19.8	144	21.5	7.8	27	57.1	2.0	55.8	50	06 38	07 20	07 58	16 02	17 10	18 22	19 35	
	11	344	46.6		19.6	158	48.3	7.8	27	55.1	2.1	55.8	45	06 27	07 04	07 38	16 31	17 36	18 44	19 51	
	12	359	46.3	S23	19.5	173	15.1	7.8	N27	53.0	2.3	55.7	N 40	06 16	06 50	07 21	16 54	17 57	19 01	20 04	
	13	14	46.0		19.4	187	41.9	7.9	27	50.7	2.4	55.7	35	06 07	06 39	07 07	17 13	18 14	19 15	20 15	
	14	29	45.7		19.3	202	08.8	8.0	27	48.3	2.6	55.7	30	05 58	06 28	06 55	17 29	18 29	19 28	20 25	
	15	44	45.4		19.2	216	35.8	8.0	27	45.7	2.7	55.7	20	05 42	06 09	06 33	17 57	18 54	19 49	20 42	
	16	59	45.1		19.1	231	02.8	8.1	27	43.0	2.9	55.7	N 10	05 26	05 52	06 15	18 20	19 15	20 07	20 57	
	17	74	44.8		19.0	245	29.9	8.1	27	40.1	3.0	55.6	0	05 09	05 35	05 58	18 42	19 35	20 24	21 10	
	18	89	44.5	S23	18.9	259	57.0	8.2	N27	37.1	3.2	55.6	S 10	04 50	05 17	05 40	19 04	19 55	20 42	21 24	
	19	104	44.2		18.8	274	24.2	8.3	27	33.9	3.3	55.6	20	04 28	04 57	05 21	19 28	20 17	21 00	21 38	
	20	119	43.8		18.7	288	51.5	8.3	27	30.6	3.4	55.6	30	03 59	04 32	04 59	19 55	20 41	21 21	21 54	
	21	134	43.5		18.6	303	18.8	8.4	27	27.2	3.6	55.6	35	03 40	04 17	04 46	20 11	20 56	21 33	22 04	
	22	149	43.2		18.5	317	46.2	8.4	27	23.6	3.8	55.5	40	03 17	03 59	04 31	20 30	21 12	21 47	22 15	
	23	164	42.9		18.3	332	13.6	8.5	27	19.8	3.9	55.5	45	02 47	03 36	04 13	20 53	21 32	22 03	22 27	
THURSDAY	28 00	179	42.6	S23	18.2	346	41.1	8.6	N27	15.9	4.0	55.5	S 50	02 01	03 07	03 51	21 21	21 57	22 23	22 43	
	01	194	42.3		18.1	1	08.7	8.6	27	11.9	4.2	55.5	52	01 34	02 52	03 40	21 35	22 09	22 33	22 50	
	02	209	42.0		18.0	15	36.3	8.8	27	07.7	4.3	55.5	54	00 49	02 34	03 28	21 52	22 23	22 44	22 58	
	03	224	41.7		17.9	30	04.1	8.8	27	03.4	4.5	55.4	56	////	02 12	03 14	22 11	22 39	22 56	23 07	
	04	239	41.4		17.8	44	31.9	8.8	26	58.9	4.6	55.4	58	////	01 42	02 57	22 35	22 58	23 10	23 16	
	05	254	41.1		17.6	58	59.7	8.9	26	54.3	4.7	55.4	S 60	////	00 54	02 37	23 07	23 21	23 26	23 28	
	06	269	40.8	S23	17.5	73	27.6	9.1	N26	49.6	4.9	55.4	Lat.	Sunset	Twilight		Moonset				
	07	284	40.5		17.4	87	55.7	9.0	26	44.7	5.0	55.4			Civil	Naut.	27	28	29	30	
	08	299	40.2		17.3	102	23.7	9.2	26	39.7	5.1	55.3	°	h m	h m	h m	h m	h m	h m	h m	h m
	09	314	39.9		17.2	116	51.9	9.2	26	34.6	5.3	55.3									
	10	329	39.6		17.0	131	20.1	9.4	26	29.3	5.4	55.3	N 70		14 09	15 56					13 51
	11	344	39.3		16.9	145	48.5	9.4	26	23.9	5.5	55.3	68		14 43	16 12					12 58
	12	359	39.0	S23	16.8	160	16.9	9.4	N26	18.4	5.7	55.3	66	13 29	15 08	16 25			13 08	12 25	
	13	14	38.7		16.7	174	45.3	9.6	26	12.7	5.8	55.2	64	14 10	15 28	16 36			12 17	12 00	
	14	29	38.3		16.5	189	13.9	9.6	26	06.9	5.9	55.2	62	14 38	15 43	16 45	11 55	11 50	11 45	11 41	
	15	44	38.0		16.4	203	42.5	9.8	26	01.0	6.0	55.2	60	14 59	15 57	16 54	10 48	11 12	11 22	11 25	
	16	59	37.7		16.3	218	11.3	9.8	25	55.0	6.2	55.2	N 58	15 17	16 08	17 01	10 14	10 45	11 02	11 12	
	17	74	37.4		16.2	232	40.1	9.8	25	48.8	6.3	55.2	56	15 31	16 19	17 08	09 48	10 24	10 46	11 00	
	18	89	37.1	S23	16.0	247	08.9	10.0	N25	42.5	6.4	55.1	54	15 44	16 28	17 14	09 28	10 07	10 33	10 50	
	19	104	36.8		15.9	261	37.9	10.1	25	36.1	6.6	55.1	52	15 55	16 36	17 19	09 11	09 52	10 20	10 41	
	20	119	36.5		15.8	276	07.0	10.1	25	29.5	6.7	55.1	50	16 05	16 43	17 25	08 56	09 39	10 10	10 32	
	21	134	36.2		15.6	290	36.1	10.2	25	22.8	6.7	55.1	45	16 25	16 59	17 36	08 27	09 12	09 47	10 15	
	22	149	35.9		15.5	305	05.3	10.4	25	16.1	6.9	55.1	N 40	16 42	17 12	17 47	08 04	08 51	09 29	10 00	
	23	164	35.6		15.4	319	34.7	10.4	25	09.2	7.1	55.1	35	16 56	17 24	17 56	07 44	08 33	09 14	09 48	
	FRIDAY	29 00	179	35.3	S23	15.2	334	04.1	10.4	N25	02.1	7.1	55.0	30	17 08	17 35	18 05	07 28	08 18	09 01	09 37
01		194	35.0		15.1	348	33.5	10.6	24	55.0	7.3	55.0	20	17 29	17 53	18 21	07 00	07 52	08 38	09 19	
02		209	34.7		15.0	3	03.1	10.7	24	47.7	7.3	55.0	N 10	17 48	18 11	18 37	06 36	07 29	08 18	09 02	
03		224	34.4		14.8	17	32.8	10.7	24	40.4	7.5	55.0	0	18 05	18 28	18 54	06 14	07 08	07 59	08 47	
04		239	34.1		14.7	32	02.5	10.9	24	32.9	7.6	55.0	S 10	18 23	18 46	19 13	05 51	06 47	07 41	08 32	
05		254	33.8		14.6	46	32.4	10.9	24	25.3	7.7	54.9	20	18 41	19 06	19 35	05 27	06 24	07 21	08 15	
06		269	33.5	S23	14.4	61	02.3	11.0	N24	17.6	7.8	54.9	30	19 03	19 31	20 04	04 59	05 58	06 57	07 56	
07		284	33.2		14.3	75	32.3	11.1	24	09.8	8.0	54.9	35	19 16	19 46	20 23	04 42	05 42	06 43	07 45	
08		299	32.9		14.1	90	02.4	11.2	24	01.8	8.0	54.9	40	19 31	20 04	20 46	04 23	05 24	06 27	07 32	
09		314	32.6		14.0	104	32.6	11.3	23	53.8	8.2	54.9	45	19 49	20 26	21 16	03 59	05 01	06 08	07 16	
10		329	32.3		13.9	119	02.9	11.4	23	45.6	8.2	54.9	S 50	20 11	20 56	22 01	03 29	04 33	05 44	06 57	
11		344	32.0		13.7	133	33.3	11.4	23	37.4	8.4	54.8	52	20 22	21 11	22 28	03 14	04 19	05 32	06 48	
12		359	31.7	S23	13.6	148	03.7	11.6	N23	29.0	8.4	54.8	54	20 34	21 29	23 12	02 56	04 03	05 19	06 38	
13		14	31.4		13.4	162	34.3	11.6	23	20.6	8.6	54.8	56	20 48	21 50	////	02 35	03 44	05 04	06 26	
14		29	31.1		13.3	177	04.9	11.8	23	12.0	8.6	54.8	58	21 05	22 20	////	02 08	03 20	04 45	06 13	
15		44	30.8		13.1	191	35.7	11.8	23	03.4	8.8	54.8	S 60	21 25	23 07	////	01 30	02 48	04 23	05 57	
16		59	30.5		13.0	206	06.5	11.9	22	54.6	8.8	54.8	Day	SUN		MOON					
17		74	30.2		12.8	220	37.4	12.0	22	45.8	9.0	54.8		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
18		89	29.8	S23	12.7	235	08.4	12.1	N22	36.8	9.1	54.7	00 ^h	12 ^h	Pass.	Upper	Lower				
19		104	29.5		12.6	249	39.5	12.2	22	27.7	9.1	54.7	d	m s	m s	h m	h m	h m	d %		
20		119	29.2		12.4	264	10.7	12.2	22	18.6	9.2	54.7	27	00 39	00 54	12 012					



UT	ARIES			VENUS -4.0			MARS +1.4			JUPITER -2.6			SATURN +0.9			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
SATURDAY	00	98 10.8	219 43.5	S18 13.6	192 44.7	S23 54.2	64 29.4	N12 15.3	122 34.0	S11 54.3	Acamar	315 12.1	S40 12.7					
	01	113 13.3	234 42.9	14.3	207 45.1	54.3	79 31.9	15.3	137 36.3	54.2	Achernar	335 20.6	S57 07.2					
	02	128 15.7	249 42.2	15.0	222 45.6	54.4	94 34.4	15.3	152 38.5	54.1	Acrux	173 01.0	S63 13.6					
	03	143 18.2	264 41.6	15.7	237 46.0	54.4	109 36.8	15.3	167 40.8	54.0	Adhara	255 06.1	S29 00.2					
	04	158 20.7	279 41.0	16.4	252 46.5	54.5	124 39.3	15.3	182 43.1	54.0	Aldebaran	290 40.3	N16 33.5					
	05	173 23.1	294 40.3	17.1	267 46.9	54.6	139 41.8	15.3	197 45.3	53.9								
	06	188 25.6	309 39.7	S18 17.7	282 47.4	S23 54.7	154 44.3	N12 15.3	212 47.6	S11 53.8	Alioth	166 13.8	N55 49.5					
	07	203 28.0	324 39.0	18.4	297 47.8	54.8	169 46.7	15.3	227 49.8	53.7	Alkaid	152 52.8	N49 11.4					
	08	218 30.5	339 38.4	19.1	312 48.2	54.8	184 49.2	15.3	242 52.1	53.6	Alnair	27 34.3	S46 50.9					
	09	233 33.0	354 37.7	19.8	327 48.7	54.9	199 51.7	15.4	257 54.4	53.6	Alnilam	275 38.3	S 1 11.2					
	10	248 35.4	9 37.1	20.5	342 49.1	55.0	214 54.2	15.4	272 56.6	53.5	Alphard	217 48.3	S 8 45.7					
	11	263 37.9	24 36.4	21.2	357 49.6	55.1	229 56.6	15.4	287 58.9	53.4								
	12	278 40.4	39 35.8	S18 21.9	12 50.0	S23 55.2	244 59.1	N12 15.4	303 01.1	S11 53.3	Alphecca	126 04.7	N26 37.9					
	13	293 42.8	54 35.1	22.6	27 50.4	55.2	260 01.6	15.4	318 03.4	53.2	Alpheratz	357 35.7	N29 13.5					
	14	308 45.3	69 34.5	23.3	42 50.9	55.3	275 04.1	15.4	333 05.7	53.1	Altair	62 01.1	N 8 55.9					
	15	323 47.8	84 33.8	24.0	57 51.3	55.4	290 06.5	15.4	348 07.9	53.1	Ankaa	353 08.0	S42 10.8					
	16	338 50.2	99 33.2	24.6	72 51.8	55.5	305 09.0	15.4	3 10.2	53.0	Antares	112 17.2	S26 29.0					
	17	353 52.7	114 32.5	25.3	87 52.2	55.5	320 11.5	15.4	18 12.4	52.9								
	18	8 55.2	129 31.9	S18 26.0	102 52.6	S23 55.6	335 14.0	N12 15.5	33 14.7	S11 52.8	Arcturus	145 48.8	N19 03.3					
	19	23 57.6	144 31.2	26.7	117 53.1	55.7	350 16.4	15.5	48 16.9	52.7	Atria	107 12.7	S69 04.1					
	20	39 00.1	159 30.6	27.4	132 53.5	55.8	5 18.9	15.5	63 19.2	52.7	Avior	234 14.5	S59 35.0					
	21	54 02.5	174 29.9	28.1	147 54.0	55.8	20 21.4	15.5	78 21.5	52.6	Bellatrix	278 23.5	N 6 22.3					
	22	69 05.0	189 29.2	28.7	162 54.4	55.9	35 23.8	15.5	93 23.7	52.5	Betelgeuse	270 52.7	N 7 24.7					
	23	84 07.5	204 28.6	29.4	177 54.9	56.0	50 26.3	15.5	108 26.0	52.4								
SUNDAY	00	99 09.9	219 27.9	S18 30.1	192 55.3	S23 56.1	65 28.8	N12 15.5	123 28.2	S11 52.3	Canopus	263 52.2	S52 42.5					
	01	114 12.4	234 27.3	30.8	207 55.7	56.1	80 31.2	15.5	138 30.5	52.2	Capella	280 22.7	N46 01.4					
	02	129 14.9	249 26.6	31.5	222 56.2	56.2	95 33.7	15.5	153 32.7	52.2	Deneb	49 26.8	N45 22.0					
	03	144 17.3	264 26.0	32.1	237 56.6	56.3	110 36.2	15.6	168 35.0	52.1	Denebola	182 25.7	N14 26.2					
	04	159 19.8	279 25.3	32.8	252 57.0	56.4	125 38.7	15.6	183 37.3	52.0	Diphda	348 48.1	S17 51.5					
	05	174 22.3	294 24.6	33.5	267 57.5	56.4	140 41.1	15.6	198 39.5	51.9								
	06	189 24.7	309 24.0	S18 34.2	282 57.9	S23 56.5	155 43.6	N12 15.6	213 41.8	S11 51.8	Dubhe	193 41.8	N61 37.0					
	07	204 27.2	324 23.3	34.8	297 58.4	56.6	170 46.1	15.6	228 44.0	51.8	Elnath	278 02.6	N28 37.7					
	08	219 29.6	339 22.7	35.5	312 58.8	56.6	185 48.5	15.6	243 46.3	51.7	Eltanin	90 43.1	N51 29.0					
	09	234 32.1	354 22.0	36.2	327 59.2	56.7	200 51.0	15.6	258 48.5	51.6	Enif	33 39.9	N 9 59.1					
	10	249 34.6	9 21.3	36.8	342 59.7	56.8	215 53.5	15.6	273 50.8	51.5	Fomalhaut	15 15.6	S29 29.9					
	11	264 37.0	24 20.7	37.5	358 00.1	56.8	230 55.9	15.7	288 53.1	51.4								
	12	279 39.5	39 20.0	S18 38.2	13 00.6	S23 56.9	245 58.4	N12 15.7	303 55.3	S11 51.3	Gacrux	171 52.6	S57 14.5					
	13	294 42.0	54 19.3	38.9	28 01.0	57.0	261 00.9	15.7	318 57.6	51.3	Gienah	175 44.4	S17 40.4					
	14	309 44.4	69 18.7	39.5	43 01.4	57.0	276 03.3	15.7	333 59.8	51.2	Hadar	148 37.5	S60 29.0					
	15	324 46.9	84 18.0	40.2	58 01.9	57.1	291 05.8	15.7	349 02.1	51.1	Hamal	327 52.0	N23 34.6					
	16	339 49.4	99 17.4	40.9	73 02.3	57.2	306 08.2	15.7	4 04.3	51.0	Kaus Aust.	83 34.1	S34 22.4					
	17	354 51.8	114 16.7	41.5	88 02.7	57.2	321 10.7	15.7	19 06.6	50.9								
	18	9 54.3	129 16.0	S18 42.2	103 03.2	S23 57.3	336 13.2	N12 15.8	34 08.8	S11 50.8	Kochab	137 20.5	N74 03.1					
	19	24 56.8	144 15.4	42.9	118 03.6	57.4	351 15.6	15.8	49 11.1	50.8	Markab	13 30.9	N15 20.1					
	20	39 59.2	159 14.7	43.5	133 04.1	57.4	6 18.1	15.8	64 13.4	50.7	Menkar	314 06.8	N 4 11.0					
	21	55 01.7	174 14.0	44.2	148 04.5	57.5	21 20.6	15.8	79 15.6	50.6	Menkent	147 58.8	S36 29.1					
	22	70 04.1	189 13.4	44.8	163 04.9	57.6	36 23.0	15.8	94 17.9	50.5	Miaplacidus	221 37.7	S69 48.7					
	23	85 06.6	204 12.7	45.5	178 05.4	57.6	51 25.5	15.8	109 20.1	50.4								
MONDAY	00	100 09.1	219 12.0	S18 46.2	193 05.8	S23 57.7	66 27.9	N12 15.8	124 22.4	S11 50.3	Mirfak	308 29.1	N49 56.9					
	01	115 11.5	234 11.3	46.8	208 06.2	57.7	81 30.4	15.9	139 24.6	50.3	Nunki	75 49.2	S26 16.1					
	02	130 14.0	249 10.7	47.5	223 06.7	57.8	96 32.9	15.9	154 26.9	50.2	Peacock	53 07.6	S56 39.6					
	03	145 16.5	264 10.0	48.1	238 07.1	57.9	111 35.3	15.9	169 29.1	50.1	Pollux	243 18.0	N27 58.0					
	04	160 18.9	279 09.3	48.8	253 07.6	57.9	126 37.8	15.9	184 31.4	50.0	Procyon	244 51.4	N 5 09.8					
	05	175 21.4	294 08.7	49.5	268 08.0	58.0	141 40.2	15.9	199 33.6	49.9								
	06	190 23.9	309 08.0	S18 50.1	283 08.4	S23 58.0	156 42.7	N12 15.9	214 35.9	S11 49.8	Rasalhague	95 59.7	N12 32.5					
	07	205 26.3	324 07.3	50.8	298 08.9	58.1	171 45.2	15.9	229 38.2	49.8	Regulus	207 35.1	N11 51.0					
	08	220 28.8	339 06.6	51.4	313 09.3	58.2	186 47.6	16.0	244 40.4	49.7	Rigel	281 04.4	S 8 10.5					
	09	235 31.3	354 06.0	52.1	328 09.7	58.2	201 50.1	16.0	259 42.7	49.6	Rigel Kent.	139 41.8	S60 55.8					
	10	250 33.7	9 05.3	52.7	343 10.2	58.3	216 52.5	16.0	274 44.9	49.5	Sabik	102 04.1	S15 45.3					
	11	265 36.2	24 04.6	53.4	358 10.6	58.3	231 55.0	16.0	289 47.2	49.4								
	12	280 38.6	39 04.0	S18 54.0	13 11.0	S23 58.4	246 57.5	N12 16.0	304 49.4	S11 49.3	Schedar	349 32.0	N56 40.4					
	13	295 41.1	54 03.3	54.7	28 11.5	58.5	261 59.9	16.0	319 51.7	49.3	Shaula	96 11.9	S37 07.2					
	14	310 43.6	69 02.6	55.3	43 11.9	58.5	277 02.4	16.1	334 53.9	49.2	Sirius	258 26.6	S16 44.9					
	15	325 46.0	84 01.9	56.0	58 12.3	58.6	292 04.8	16.1	349 56.2	49.1	Spica	158 23.3	S11 17.1					
	16	340 48.5	99 01.2	56.6	73 12.8	58.6	307 07.3	16.1	4 58.4	49.0	Suhail	222 46.6	S43 31.6					
	17	355 51.0	114 00.6	57.3	88 13.2	58.7	322 09.7	16.1	20 00.7	48.9								
	18	10 53.4	128 59.9	S18 57.9	103 13.7	S23 58.7	337 12.2	N12 16.1	35 02.9	S11 48.8	Vega	80 34.2	N38 48.3					
	19	25 55.9	143 59.2	58.5	118 14.1	58.8	352 14.6	16.1	50 05.2	48.8	Zuben'ubi	136 57.2	S16 08.4					
	20	40 58.4	158 58.5	59.2	133 14.5	58.8	7 17.1	16.2	65 07.4	48.7								
	21	56 00.8	173 57.9	18 59.8	148 15.0	58.9	22 19.5	16.2	80 09.7	48.6								
	22	71 03.3	188 57.2	19 00.5	163 15.4	58.9	37 22.0	16.2	95 12.0	48.5	Venus	120 18.0	9 23					
	23	86 05.7	203 56.5	S19 01.1	178 15.8	59.0	52 24.5	16.2	110 14.2	48.4	Mars	93 45.4	11 08					
														Jupiter	326 18.8	19 35		
														Saturn	24 18.3	15 44		

UT	SUN				MOON							Lat.	Twilight		Sunrise	Moonrise			
	GHA	Dec			GHA	v	Dec	d	HP	Naut.	Civil		30	31		1	2		
d h	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	° / ' / "	°	h m	h m	h m	h m	h m	h m	h m	h m	
30	00	179 28.0 S23 11.8	322 16.2 12.7	N21 41.1	9.6	54.6				N 72	08 25	10 46			18 33	20 47	22 46		
	01	194 27.7	11.6	336 47.9 12.7	21 31.5	9.7	54.6			N 70	08 06	09 51			16 25	19 01	21 00	22 49	
	02	209 27.4	11.5	351 19.6 12.7	21 21.8	9.8	54.6			68	07 50	09 18			17 17	19 22	21 10	22 51	
	03	224 27.1	11.3	5 51.3 12.9	21 12.0	9.9	54.6			66	07 38	08 54	10 30	17 48	19 39	21 18	22 53		
	04	239 26.8	11.2	20 23.2 13.0	21 02.1	9.9	54.6			64	07 27	08 35	09 51	18 12	19 52	21 25	22 55		
SATURDAY	05	254 26.5	11.0	34 55.2 13.0	20 52.2	10.1	54.6			62	07 18	08 19	09 24	18 30	20 03	21 31	22 56		
	06	269 26.2 S23 10.9	49 27.2 13.2	N20 42.1	10.1	54.6			60	07 09	08 06	09 03	18 45	20 13	21 36	22 58			
	07	284 25.9	10.7	63 59.4 13.2	20 32.0	10.2	54.6			N 58	07 02	07 54	08 46	18 58	20 21	21 41	22 59		
	08	299 25.6	10.5	78 31.6 13.3	20 21.8	10.3	54.5			56	06 56	07 44	08 31	19 09	20 28	21 45	23 00		
	09	314 25.3	10.4	93 03.9 13.4	20 11.5	10.4	54.5			54	06 50	07 36	08 19	19 19	20 35	21 48	23 01		
	10	329 25.0	10.2	107 36.3 13.4	20 01.1	10.4	54.5			52	06 44	07 28	08 08	19 27	20 40	21 51	23 01		
	11	344 24.7	10.1	122 08.7 13.6	19 50.7	10.5	54.5			50	06 39	07 20	07 59	19 35	20 46	21 54	23 02		
	12	359 24.4 S23 09.9	136 41.3 13.6	N19 40.2	10.6	54.5			45	06 27	07 04	07 38	19 51	20 57	22 01	23 04			
	13	14 24.1	09.7	151 13.9 13.7	19 29.6	10.7	54.5			N 40	06 17	06 51	07 22	20 04	21 06	22 06	23 05		
	14	29 23.8	09.6	165 46.6 13.8	19 18.9	10.8	54.5			35	06 08	06 40	07 08	20 15	21 14	22 11	23 06		
	15	44 23.5	09.4	180 19.4 13.9	19 08.1	10.8	54.5			30	05 59	06 29	06 55	20 25	21 21	22 15	23 07		
	16	59 23.2	09.2	194 52.3 13.9	18 57.3	10.9	54.4			20	05 43	06 11	06 35	20 42	21 33	22 21	23 09		
	17	74 22.9	09.1	209 25.2 14.1	18 46.4	11.0	54.4			N 10	05 27	05 54	06 16	20 57	21 43	22 27	23 11		
	18	89 22.6 S23 08.9	223 58.3 14.1	N18 35.4	11.0	54.4			0	05 10	05 37	05 59	21 10	21 53	22 33	23 12			
	19	104 22.3	08.7	238 31.4 14.2	18 24.4	11.1	54.4			S 10	04 52	05 19	05 42	21 24	22 02	22 39	23 14		
	20	119 22.0	08.6	253 04.6 14.2	18 13.3	11.2	54.4			20	04 29	04 59	05 23	21 38	22 13	22 45	23 15		
	21	134 21.7	08.4	267 37.8 14.4	18 02.1	11.3	54.4			30	04 01	04 34	05 01	21 54	22 24	22 51	23 17		
	22	149 21.4	08.2	282 11.2 14.4	17 50.8	11.3	54.4			35	03 42	04 19	04 48	22 04	22 31	22 55	23 18		
	23	164 21.1	08.1	296 44.6 14.5	17 39.5	11.4	54.4			40	03 19	04 01	04 34	22 15	22 38	22 59	23 19		
	31	00	179 20.8 S23 07.9	311 18.1 14.5	N17 28.1	11.4	54.4			45	02 49	03 39	04 16	22 27	22 47	23 05	23 20		
		01	194 20.5	07.7	325 51.6 14.7	17 16.7	11.5	54.3			S 50	02 05	03 10	03 54	22 43	22 58	23 11	23 22	
		02	209 20.2	07.5	340 25.3 14.7	17 05.2	11.6	54.3			52	01 38	02 55	03 43	22 50	23 03	23 13	23 23	
		03	224 19.9	07.4	354 59.0 14.7	16 53.6	11.6	54.3			54	00 56	02 37	03 31	22 58	23 08	23 16	23 24	
		04	239 19.6	07.2	9 32.7 14.9	16 42.0	11.7	54.3			56	////	02 16	03 17	23 07	23 14	23 20	23 25	
	SUNDAY	05	254 19.3	07.0	24 06.6 14.9	16 30.3	11.8	54.3			S 60	////	01 02	02 41	23 28	23 28	23 27	23 27	
06		269 19.0 S23 06.8	38 40.5 15.0	N16 18.5	11.8	54.3				Lat.	Sunset	Twilight		Moonset					
07		284 18.7	06.7	53 14.5 15.1	16 06.7	11.9	54.3					Civil	Naut.	30	31	1	2		
08		299 18.4	06.5	67 48.6 15.1	15 54.8	11.9	54.3												
09		314 18.1	06.3	82 22.7 15.2	15 42.9	12.0	54.3												
10		329 17.8	06.1	96 56.9 15.2	15 30.9	12.0	54.3												
11		344 17.5	05.9	111 31.1 15.3	15 18.9	12.1	54.3			N 72		13 20	15 41		13 15	12 25	11 51		
12		359 17.2 S23 05.8	126 05.4 15.4	N15 06.8	12.2	54.3			N 70		14 15	16 00	13 51	12 44	12 11	11 45			
13		14 16.9	05.6	140 39.8 15.5	14 54.6	12.2	54.2			68		14 48	16 16	12 58	12 22	11 58	11 40		
14		29 16.6	05.4	155 14.3 15.5	14 42.4	12.2	54.2			66	13 36	15 12	16 28	12 25	12 04	11 48	11 35		
15		44 16.3	05.2	169 48.8 15.5	14 30.2	12.3	54.2			64	14 15	15 31	16 39	12 00	11 49	11 40	11 32		
16		59 16.0	05.0	184 23.3 15.7	14 17.9	12.4	54.2			62	14 42	15 47	16 48	11 41	11 37	11 33	11 28		
17		74 15.7	04.8	198 58.0 15.7	14 05.5	12.4	54.2			60	15 03	16 00	16 56	11 25	11 26	11 26	11 26		
18		89 15.5 S23 04.6	213 32.7 15.7	N13 53.1	12.5	54.2			N 58	15 20	16 11	17 04	11 12	11 17	11 21	11 23			
19		104 15.2	04.5	228 07.4 15.8	13 40.6	12.5	54.2			56	15 34	16 21	17 10	11 00	11 09	11 16	11 21		
20		119 14.9	04.3	242 42.2 15.9	13 28.1	12.5	54.2			54	15 47	16 30	17 16	10 50	11 02	11 11	11 19		
21		134 14.6	04.1	257 17.1 15.9	13 15.6	12.6	54.2			52	15 58	16 38	17 22	10 41	10 55	11 07	11 17		
22		149 14.3	03.9	271 52.0 15.9	13 03.0	12.7	54.2			50	16 07	16 46	17 27	10 32	10 49	11 03	11 15		
23		164 14.0	03.7	286 26.9 16.1	12 50.3	12.7	54.2			45	16 28	17 01	17 39	10 15	10 37	10 55	11 12		
1		00	179 13.7 S23 03.5	301 02.0 16.0	N12 37.6	12.7	54.2			N 40	16 44	17 15	17 49	10 00	10 26	10 48	11 08		
		01	194 13.4	03.3	315 37.0 16.2	12 24.9	12.8	54.2			35	16 58	17 26	17 58	09 48	10 17	10 42	11 06	
		02	209 13.1	03.1	330 12.2 16.1	12 12.1	12.8	54.2			30	17 10	17 37	18 06	09 37	10 09	10 37	11 03	
		03	224 12.8	02.9	344 47.3 16.3	11 59.3	12.8	54.2			20	17 31	17 55	18 23	09 19	09 55	10 28	10 59	
		04	239 12.5	02.7	359 22.6 16.2	11 46.5	12.9	54.2			N 10	17 49	18 12	18 38	09 02	09 43	10 20	10 55	
MONDAY		05	254 12.2	02.5	13 57.8 16.3	11 33.6	13.0	54.2			0	18 07	18 29	18 55	08 47	09 31	10 12	10 52	
	06	269 11.9 S23 02.3	28 33.1 16.4	N11 20.6	13.0	54.2			S 10	18 24	18 47	19 14	08 32	09 19	10 05	10 48			
	07	284 11.6	02.1	43 08.5 16.4	11 07.6	13.0	54.2			20	18 43	19 07	19 36	08 15	09 07	09 56	10 44		
	08	299 11.3	01.9	57 43.9 16.5	10 54.6	13.0	54.2			30	19 04	19 32	20 05	07 56	08 52	09 47	10 40		
	09	314 11.0	01.7	72 19.4 16.5	10 41.6	13.1	54.2			35	19 17	19 47	20 23	07 45	08 44	09 41	10 38		
	10	329 10.7	01.5	86 54.9 16.5	10 28.5	13.2	54.2			40	19 32	20 05	20 46	07 32	08 34	09 35	10 35		
	11	344 10.4	01.3	101 30.4 16.6	10 15.3	13.1	54.2			45	19 50	20 27	21 16	07 16	08 23	09 28	10 31		
	12	359 10.1 S23 01.1	116 06.0 16.6	N10 02.2	13.2	54.2			S 50	20 12	20 56	22 00	06 57	08 09	09 19	10 27			
	13	14 09.8	00.9	130 41.6 16.6	9 49.0	13.2	54.2			52	20 22	21 10	22 26	06 48	08 03	09 15	10 25		
	14	29 09.5	00.7	145 17.2 16.7	9 35.8	13.3	54.2			54	20 34	21 28	23 07	06 38	07 55	09 10	10 23		
	15	44 09.2	00.5	159 52.9 16.8	9 22.5	13.3	54.2			56	20 48	21 49	////	06 26	07 47	09 05	10 21		
	16	59 08.9	00.3	174 28.7 16.7	9 09.2	13.3	54.2			58	21 04	22 17	////	06 13	07 38	09 00	10 18		
	17	74 08.6	23 00.1	189 04.4 16.8	8 55.9	13.4	54.2			S 60	21 24	23 02	////	05 57	07 28	08 53	10 16		
	18	89 08.3 S22 59.9	203 40.2 16.9	N 8 42.5	13.4	54.2				Day	Eqn. of Time		Mer.	Mer. Pass.		Age	Phase		
	19	104 08.1	59.7	218 16.1 16.8	8 29.1	13.4	54.2				00 ^h	12 ^h	Pass.	Upper	Lower				
	20	119 07.8	59.5	232 51.9 16															

EXPLANATION

PRINCIPLE AND ARRANGEMENT

1. *Object.* The object of this Almanac is to provide, in a convenient form, the data required for the practice of astronomical navigation at sea.

2. *Principle.* The main contents of the Almanac consist of data from which the *Greenwich Hour Angle* (GHA) and the *Declination* (Dec) of all the bodies used for navigation can be obtained for any instant of *Universal Time* (UT, specifically UT1, or previously Greenwich Mean Time (GMT)).

The *Local Hour Angle* (LHA) can then be obtained by means of the formula:

$$\text{LHA} = \text{GHA} \begin{array}{l} - \text{west} \\ + \text{east} \end{array} \text{ longitude}$$

The remaining data consist of: times of rising and setting of the Sun and Moon, and times of twilight; miscellaneous calendrical and planning data and auxiliary tables, including a list of Standard Times; corrections to be applied to observed altitude.

For the Sun, Moon, and planets, the GHA and Dec are tabulated directly for each hour of UT throughout the year. For the stars, the *Sidereal Hour Angle* (SHA) is given, and the GHA is obtained from:

$$\text{GHA Star} = \text{GHA Aries} + \text{SHA Star}$$

The SHA and Dec of the stars change slowly and may be regarded as constant over periods of several days. GHA Aries, or the Greenwich Hour Angle of the first point of Aries (the Vernal Equinox), is tabulated for each hour. Permanent tables give the appropriate increments and corrections to the tabulated hourly values of GHA and Dec for the minutes and seconds of UT.

The six-volume series of *Sight Reduction Tables for Marine Navigation* (published in U.S.A. as Pub. No. 229) has been designed for the solution of the navigational triangle and is intended for use with *The Nautical Almanac*.

Two alternative procedures for sight reduction are described on pages 277–318. The first requires the use of programmable calculators or computers, while the second uses a set of concise tables that is given on pages 286–317.

The tabular accuracy is 0.1 throughout. The time argument on the daily pages of this Almanac is UT1 denoted throughout by UT. This scale may differ from the broadcast time signals (UTC) by an amount which, if ignored, will introduce an error of up to 0.2 in longitude determined from astronomical observations. The difference arises because the time argument depends on the variable rate of rotation of the Earth while the broadcast time signals are based on an atomic time-scale. Step adjustments of exactly one second are made to the time signals as required (normally at 24^h on December 31 and June 30) so that the difference between the time signals and UT, as used in this Almanac, may not exceed 0.9. Those who require to reduce observations to a precision of better than 1^s must therefore obtain the correction (DUT1) to the time signals from coding in the signal, or from other sources; the required time is given by UT1=UTC+DUT1 to a precision of 0.1. Alternatively, the longitude, when determined from astronomical observations, may be corrected by the corresponding amount shown in the following table:

Correction to time signals	Correction to longitude
−0.9 to −0.7	0.2 to east
−0.6 to −0.3	0.1 to east
−0.2 to +0.2	no correction
+0.3 to +0.6	0.1 to west
+0.7 to +0.9	0.2 to west

3. *Lay-out.* The ephemeral data for three days are presented on an opening of two pages: the left-hand page contains the data for the planets and stars; the right-hand page contains the data for the Sun and Moon, together with times of twilight, sunrise, sunset, moonrise and moonset.

The remaining contents are arranged as follows: for ease of reference the altitude-correction tables are given on pages A2, A3, A4, xxxiv and xxxv; calendar, Moon's phases, eclipses, and planet notes (i.e. data of general interest) precede the main tabulations. The Explanation is followed by information on standard times, star charts and list of star positions, sight reduction procedures and concise sight reduction tables, polar phenomena information and graphs, tables of increments and corrections and other auxiliary tables that are frequently used.

MAIN DATA

4. *Daily pages.* The daily pages give the GHA of Aries, the GHA and Dec of the Sun, Moon, and the four navigational planets, for each hour of UT. For the Moon, values of v and d are also tabulated for each hour to facilitate the correction of GHA and Dec to intermediate times; v and d for the Sun and planets change so slowly that they are given, at the foot of the appropriate columns, once only on the page; v is zero for Aries and negligible for the Sun, and is omitted. The SHA and Dec of the 57 selected stars, arranged in alphabetical order of proper name, are also given.

5. *Stars.* The SHA and Dec of 173 stars, including the 57 selected stars, are tabulated for each month on pages 268–273; no interpolation is required and the data can be used in precisely the same way as those for the selected stars on the daily pages. The stars are arranged in order of SHA.

The list of 173 includes all stars down to magnitude 3.0, together with a few fainter ones to fill the larger gaps. The 57 selected stars have been chosen from amongst these on account of brightness and distribution in the sky; they will suffice for the majority of observations.

The 57 selected stars are known by their proper names, but they are also numbered in descending order of SHA. In the list of 173 stars, the constellation names are always given on the left-hand page; on the facing page proper names are given where well-known names exist. Numbers for the selected stars are given in both columns.

An index to the selected stars, containing lists in both alphabetical and numerical order, is given on page xxxiii and is also reprinted on the bookmark.

6. *Increments and corrections.* The tables printed on tinted paper (pages ii–xxxi) at the back of the Almanac provide the increments and corrections for minutes and seconds to be applied to the hourly values of GHA and Dec. They consist of sixty tables, one for each minute, separated into two parts: increments to GHA for Sun and planets, Aries, and Moon for every minute and second; and, for each minute, corrections to be applied to GHA and Dec corresponding to the values of v and d given on the daily pages.

The increments are based on the following adopted hourly rates of increase of the GHA: Sun and planets, 15° precisely; Aries, $15^\circ 02'46''$; Moon, $14^\circ 19'0''$. The values of v on the daily pages are the excesses of the actual hourly motions over the adopted values; they are generally positive, except for Venus. The tabulated hourly values of the Sun's GHA have been adjusted to reduce to a minimum the error caused by treating v as negligible. The values of d on the daily pages are the hourly differences of the Dec. For the Moon, the true values of v and d are given for each hour; otherwise mean values are given for the three days on the page.

7. *Method of entry.* The UT of an observation is expressed as a day and hour, followed by a number of minutes and seconds. The tabular values of GHA and Dec, and, where necessary, the corresponding values of v and d , are taken directly from the daily pages for the day and hour of UT; this hour is always *before* the time of observation. SHA and Dec of the selected stars are also taken from the daily pages.

The table of Increments and Corrections for the minute of UT is then selected. For the GHA, the increment for minutes and seconds is taken from the appropriate column opposite the seconds of UT; the v -correction is taken from the second part of the same table opposite the value of v as given on the daily pages. Both increment and v -correction are to be added to the GHA, except for Venus when v is prefixed by a minus sign and the v -correction is to be subtracted. For the Dec there is no increment, but a d -correction is applied in the same way as the v -correction; d is given without sign on the daily pages and the sign of the correction is to be supplied by inspection of the Dec column. In many cases the correction may be applied mentally.

8. *Examples.* (a) Sun and Moon. Required the GHA and Dec of the Sun and Moon on 2023 March 27 at 15^h 47^m 13^s UT.

		SUN				MOON			
		GHA	Dec	d		GHA	v	Dec	d
Daily page, March 27 ^d 15 ^h		43 39.2	N 2 39.1	1.0		330 51.0	9.2	N 26 48.7	4.2
Increments for	47 ^m 13 ^s	11 48.3				11 16.0			
v or d corrections for	47 ^m		+0.8			+7.3		+3.3	
Sum for	March 27 ^d 15 ^h 47 ^m 13 ^s	55 27.5	N 2 39.9			342 14.3		N 26 52.0	

(b) Planets. Required the LHA and Dec of (i) Venus on 2023 March 27 at 13^h 20^m 58^s UT in longitude E 82° 32'; (ii) Saturn on 2023 March 27 at 11^h 01^m 59^s UT in longitude W 84° 53'.

		VENUS				SATURN			
		GHA	v	Dec	d	GHA	v	Dec	d
Daily page, Mar. 27 ^d	(13 ^h)	339 39.8	-0.4	N 16 19.6	1.0	(11 ^h)	14 54.4	2.2	S 11 54.4
Increments (planets)	(20 ^m 58 ^s)	5 14.5				(01 ^m 59 ^s)	0 29.8		
v or d corrections	(20 ^m)	-0.1		+0.3		(01 ^m)	+0.1		+0.0
Sum = GHA and Dec.		344 54.2		N 16 19.9		15 24.3		S 11 54.4	
Longitude	(east)	+ 82 32.0				(west)	- 84 53.0		
Multiples of 360°		-360				+360			
LHA planet		67 26.2				290 31.3			

(c) Stars. Required the GHA and Dec of (i) *Aldebaran* on 2023 March 27 at 16^h 20^m 38^s UT; (ii) *Vega* on 2023 March 27 at 2^h 40^m 39^s UT.

		Aldebaran			Vega		
		GHA	Dec		GHA	Dec	
Daily page (SHA and Dec)		290 41.5	N 16 33.3		80 34.2	N 38 47.9	
Daily page (GHA Aries)	(16 ^h)	64 49.6			(2 ^h)	214 15.1	
Increments (Aries)	(20 ^m 38 ^s)	5 10.3			(40 ^m 39 ^s)	10 11.4	
Sum = GHA star		360 41.4			305 00.7		
Multiples of 360°		-360					
GHA star		0 41.4			305 00.7		

9. *Polaris (Pole Star) tables.* The tables on pages 274–276 provide means by which the latitude can be deduced from an observed altitude of *Polaris*, and they also give its azimuth; their use is explained and illustrated on those pages. They are based on the following formula:

$$\text{Latitude} - H_0 = -p \cos h + \frac{1}{2}p \sin p \sin^2 h \tan(\text{latitude})$$

where

H_0 = Apparent altitude (corrected for refraction)

p = polar distance of *Polaris* = 90° – Dec

h = local hour angle of *Polaris* = LHA Aries + SHA

a_0 , which is a function of LHA Aries only, is the value of both terms of the above formula calculated for mean values of the SHA (314° 37') and Dec (N 89° 21'8) of *Polaris*, for a mean latitude of 50°, and adjusted by the addition of a constant (58'8).

a_1 , which is a function of LHA Aries and latitude, is the excess of the value of the second term over its mean value for latitude 50° , increased by a constant (0.6) to make it always positive. a_2 , which is a function of LHA Aries and date, is the correction to the first term for the variation of *Polaris* from its adopted mean position; it is increased by a constant (0.6) to make it positive. The sum of the added constants is 1° , so that:

$$\text{Latitude} = \text{Apparent altitude (corrected for refraction)} - 1^\circ + a_0 + a_1 + a_2$$

RIISING AND SETTING PHENOMENA

10. *General.* On the right-hand daily pages are given the times of sunrise and sunset, of the beginning and end of civil and nautical twilights, and of moonrise and moonset for a range of latitudes from $N 72^\circ$ to $S 60^\circ$. These times, which are given to the nearest minute, are strictly the UT of the phenomena on the Greenwich meridian; they are given for every day for moonrise and moonset, but only for the middle day of the three on each page for the solar phenomena.

They are approximately the Local Mean Times (LMT) of the corresponding phenomena on other meridians; they can be formally interpolated if desired. The UT of a phenomenon is obtained from the LMT by:

$$\text{UT} = \text{LMT} \begin{array}{l} + \text{west} \\ - \text{east} \end{array} \text{ longitude}$$

in which the longitude must first be converted to time by the table on page i or otherwise. Interpolation for latitude can be done mentally or with the aid of Table I on page xxxii.

The following symbols are used to indicate the conditions under which, in high latitudes, some of the phenomena do not occur:

□ Sun or Moon remains continuously above the horizon;

■ Sun or Moon remains continuously below the horizon;

//// twilight lasts all night.

Basis of the tabulations. At sunrise and sunset $16'$ is allowed for semi-diameter and $34'$ for horizontal refraction, so that at the times given the Sun's upper limb is on the visible horizon; all times refer to phenomena as seen from sea level with a clear horizon.

At the times given for the beginning and end of twilight, the Sun's zenith distance is 96° for civil, and 102° for nautical twilight. The degree of illumination at the times given for civil twilight (in good conditions and in the absence of other illumination) is such that the brightest stars are visible and the horizon is clearly defined. At the times given for nautical twilight, the horizon is in general not visible, and it is too dark for observation with a marine sextant.

Times corresponding to other depressions of the Sun may be obtained by interpolation or, for depressions of more than 12° , less reliably, by extrapolation; times so obtained will be subject to considerable uncertainty near extreme conditions.

At moonrise and moonset, allowance is made for semi-diameter, parallax, and refraction ($34'$), so that at the times given the Moon's upper limb is on the visible horizon as seen from sea level.

Polar phenomena. Information and graphs concerning the rising and setting of the Sun and Moon and the duration of civil twilight for high latitudes are given on pages 320–325.

11. *Sunrise, sunset, twilight.* The tabulated times may be regarded, without serious error, as the LMT of the phenomena on any of the three days on the page and in any longitude. Precise times may normally be obtained by interpolating the tabular values for latitude and to the correct day and longitude, the latter being expressed as a fraction of a day by dividing it by 360° , positive for west and negative for east longitudes. In the extreme conditions near □, ■ or //// interpolation may not be possible in one direction, but accurate times are of little value in these circumstances.

Examples. Required the UT of (a) the beginning of morning twilights and sunrise on 2023 January 13 for latitude $S 48^\circ 55'$, longitude $E 75^\circ 18'$; (b) sunset and the end of evening twilights on 2023 January 15 for latitude $N 67^\circ 10'$, longitude $W 168^\circ 05'$.

	(a)	Twilight			Sunrise			(b)	Sunset			Twilight		
		Nautical	Civil									Civil	Nautical	
		d h m	d h m	d h m	d h m	d h m			d h m	d h m	d h m	d h m	d h m	d h m
From p. 19														
LMT for Lat	S 45°	13 03 09	13 03 55	13 04 31	N 66°	15 14 22	15 15 42	15 16 53						
Corr. to	S 48° 55'	−30	−20	−16	N 67° 10'	−22	−12	−6						
(p. xxxii, Table I)														
Long (p. i)	E 75° 18'	−5 01	−5 01	−5 01	W 168° 05'	+11 12	+11 12	+11 12						
UT		12 21 38	12 22 34	12 23 14		16 01 12	16 02 42	16 03 59						

The LMT are strictly for January 14 (middle date on page) and 0° longitude; for more precise times it is necessary to interpolate, but rounding errors may accumulate to about 2^m.

(a) to January 13^d − 75°/360° = Jan. 12^d8, i.e. $\frac{1}{3}(1\cdot2) = 0\cdot4$ backwards towards the data for the same latitude interpolated similarly from page 17; the corrections are −2^m to nautical twilight, −2^m to civil twilight and −1^m to sunrise.

(b) to January 15^d + 168°/360° = Jan. 15^d5, i.e. $\frac{1}{3}(1\cdot5) = 0\cdot5$ forwards towards the data for the same latitude interpolated similarly from page 21; the corrections are +7^m to sunset, +4^m to civil twilight, and +4^m to nautical twilight.

12. *Moonrise, moonset.* Precise times of moonrise and moonset are rarely needed; a glance at the tables will generally give sufficient indication of whether the Moon is available for observation and of the hours of rising and setting. If needed, precise times may be obtained as follows. Interpolate for latitude, using Table I on page xxxii, on the day wanted and also on the preceding day in east longitudes or the following day in west longitudes; take the difference between these times and interpolate for longitude by applying to the time for the day wanted the correction from Table II on page xxxii, so that the resulting time is between the two times used. In extreme conditions near  or  interpolation for latitude or longitude may be possible only in one direction; accurate times are of little value in these circumstances.

To facilitate this interpolation, the times of moonrise and moonset are given for four days on each page; where no phenomenon occurs during a particular day (as happens once a month) the time of the phenomenon on the following day, increased by 24^h, is given; extra care must be taken when interpolating between two values, when one of those values exceeds 24^h. In practice it suffices to use the daily difference between the times for the nearest tabular latitude, and generally, to enter Table II with the nearest tabular arguments as in the examples below.

Examples. Required the UT of moonrise and moonset in latitude S 47° 10', longitudes E 124° 00' and W 78° 31' on 2023 January 8.

	Longitude E 124° 00'		Longitude W 78° 31'	
	Moonrise	Moonset	Moonrise	Moonset
	d h m	d h m	d h m	d h m
LMT for Lat. S 45°	8 21 20	8 05 19	8 21 20	8 05 19
Lat correction (p. xxxii, Table I)	+09	−11	+09	−11
Long correction (p. xxxii, Table II)	−10	−20	+04	+16
Correct LMT	8 21 19	8 04 48	8 21 33	8 05 24
Longitude (p. i)	−8 16	−8 16	+5 14	+5 14
UT	8 13 03	7 20 32	9 02 47	8 10 38

ALTITUDE CORRECTION TABLES

13. *General.* In general, two corrections are given for application to altitudes observed with a marine sextant; additional corrections are required for Venus and Mars and also for very low altitudes.

Tables of the correction for dip of the horizon, due to height of eye above sea level, are given on pages A2 and xxxiv. Strictly this correction should be applied first and subtracted from the sextant altitude to give apparent altitude, which is the correct argument for the other tables.

Separate tables are given of the second correction for the Sun, for stars and planets (on pages A2 and A3), and for the Moon (on pages xxxiv and xxxv). For the Sun, values are given for both lower and upper limbs, for two periods of the year. The star tables are used for the planets, but additional corrections for parallax (page A2) are required for Venus and Mars. The Moon tables are in two parts: the main correction is a function of apparent altitude only and is tabulated for the lower limb (30' must be subtracted to obtain the correction for the upper limb); the other, which is given for both lower and upper limbs, depends also on the horizontal parallax, which has to be taken from the daily pages.

An additional correction, given on page A4, is required for the change in the refraction, due to variations of pressure and temperature from the adopted standard conditions; it may generally be ignored for altitudes greater than 10°, except possibly in extreme conditions. The correction tables for the Sun, stars, and planets are in two parts; only those for altitudes greater than 10° are reprinted on the bookmark.

14. *Critical tables.* Some of the altitude correction tables are arranged as critical tables. In these, an interval of apparent altitude (or height of eye) corresponds to a single value of the correction; no interpolation is required. At a “critical” entry the upper of the two possible values of the correction is to be taken. For example, in the table of dip, a correction of −4.1 corresponds to all values of the height of eye from 5.3 to 5.5 metres (17.5 to 18.3 feet) inclusive.

15. *Examples.* The following examples illustrate the use of the altitude correction tables; the sextant altitudes given are assumed to be taken on 2023 August 9 with a marine sextant at height 5.4 metres (18 feet), temperature −3°C and pressure 982 mb, the Moon sights being taken at about 10^h UT.

	SUN		SUN		MOON		MOON		VENUS	Polaris		
	lower		upper		lower		upper					
	limb		limb		limb		limb					
	°	'	°	'	°	'	°	'	°	'		
Sextant altitude	21	19.7	3	20.2	33	27.6	26	06.7	4	32.6	49	36.5
Dip, height 5.4 metres (18 feet)	−4.1		−4.1		−4.1		−4.1		−4.1		−4.1	
Main correction	+13.6		−29.3		+57.4		+60.5		−10.8		−0.8	
−30' for upper limb (Moon)	—		—		—		−30.0		—		—	
L, U correction for Moon	—		—		+3.6		+2.9		—		—	
Additional correction for Venus	—		—		—		—		+0.5		—	
Additional refraction correction	−0.1		−0.6		−0.1		−0.1		−0.5		0.0	
Corrected sextant altitude	21	29.1	2	46.2	34	24.4	26	35.9	4	17.7	49	31.6

The main corrections have been taken out with apparent altitude (sextant altitude corrected for index error and dip) as argument, interpolating where possible. These refinements are rarely necessary.

16. *Composition of the Corrections.* The table for the dip of the sea horizon is based on the formula:

Correction for dip = −1.76√(height of eye in metres) = −0.97√(height of eye in feet)

The correction table for the Sun includes the effects of semi-diameter, parallax and mean refraction.

The correction tables for the stars and planets allow for the effect of mean refraction.

The phase correction for Venus has been incorporated in the tabulations for GHA and Dec, and no correction for phase is required. The additional corrections for Venus and Mars allow for parallax. Alternatively, the correction for parallax may be calculated from $p \cos H$, where p is the parallax and H is the altitude. In 2023 the values for p are:

Venus	Jan. 1	May 1	June 19	July 12	July 28	Aug. 30	Sept. 15	Oct. 9	Dec. 1	Dec. 31
	0.1	0.2	0.3	0.4	0.5	0.4	0.3	0.2	0.1	
Mars	Jan. 1	Feb. 11	Dec. 31							
	0.2	0.1								

The correction table for the Moon includes the effect of semi-diameter, parallax, augmentation and mean refraction.

Mean refraction is calculated for a temperature of 10°C (50°F), a pressure of 1010 mb (29.83 inches), humidity of 80% and wavelength 0.50169 μm .

17. *Bubble sextant observations.* When observing with a bubble sextant, no correction is necessary for dip, semi-diameter, or augmentation. The altitude corrections for the stars and planets on page A2 and on the bookmark should be used for the Sun as well as for the stars and planets; for the Moon, it is easiest to take the mean of the corrections for lower and upper limbs and subtract 15' from the altitude; the correction for dip must not be applied.

AUXILIARY AND PLANNING DATA

18. *Sun and Moon.* On the daily pages are given: hourly values of the horizontal parallax of the Moon; the semi-diameters and the times of meridian passage of both Sun and Moon over the Greenwich meridian; the equation of time; the age of the Moon, the percent (%) illuminated and a symbol indicating the phase. The times of the phases of the Moon are given in UT on page 4. For the Moon, the semi-diameters for each of the three days are given at the foot of the column; for the Sun a single value is sufficient. Table II on page xxxii may be used for interpolating the time of the Moon's meridian passage for longitude. The equation of time is given daily at 00^h and 12^h UT. The sign is *positive* for unshaded values and *negative* for shaded values. To obtain apparent time add the equation of time to mean time when the sign is *positive*. Subtract the equation of time from mean time when the sign is *negative*. At 12^h UT, when the sign is *positive*, meridian passage of the Sun occurs *before* 12^h UT, otherwise it occurs *after* 12^h UT.

19. *Planets.* The magnitudes of the planets are given immediately following their names in the headings on the daily pages; also given, for the middle day of the three on the page, are their SHA at 00^h UT and their times of meridian passage.

The planet notes and diagram on pages 8 and 9 provide descriptive information as to the suitability of the planets for observation during the year, and of their positions and movements.

20. *Stars.* The time of meridian passage of the first point of Aries over the Greenwich meridian is given on the daily pages, for the middle day of the three on the page, to 0^m1. The interval between successive meridian passages is 23^h 56^m1 (24^h less 3^m9), so that times for intermediate days and other meridians can readily be derived. If a precise time is required, it may be obtained by finding the UT at which LHA Aries is zero.

The meridian passage of a star occurs when its LHA is zero, that is when $\text{LHA Aries} + \text{SHA} = 360^\circ$. An approximate time can be obtained from the planet diagram on page 9.

The star charts on pages 266 and 267 are intended to assist identification. They show the relative positions of the stars in the sky as seen from the Earth and include all 173 stars used in the Almanac, together with a few others to complete the main constellation configurations. The local meridian at any time may be located on the chart by means of its SHA which is $360^\circ - \text{LHA Aries}$, or west longitude $- \text{GHA Aries}$.

21. *Star globe.* To set a star globe on which is printed a scale of LHA Aries, first set the globe for latitude and then rotate about the polar axis until the scale under the edge of the meridian circle reads LHA Aries.

To mark the positions of the Sun, Moon, and planets on the star globe, take the difference $\text{GHA Aries} - \text{GHA body}$ and use this along the LHA Aries scale, in conjunction with the declination, to plot the position. $\text{GHA Aries} - \text{GHA body}$ is most conveniently found by taking the difference when the GHA of the body is small (less than 15°), which happens once a day.

22. *Calendar.* On page 4 are given lists of ecclesiastical festivals, and of the principal anniversaries and holidays in the United Kingdom and the United States of America. The calendar on page 5 includes the day of the year as well as the day of the week.

Brief particulars are given, at the foot of page 5, of the solar and lunar eclipses occurring during the year; the times given are in UT. The principal features of the more important solar eclipses are shown on the maps on pages 6 and 7.

23. *Standard times.* The lists on pages 262–265 give the standard times used in most countries. In general no attempt is made to give details of the beginning and end of summer time, since they are liable to frequent changes at short notice. For the latest information consult Admiralty List of Radio Signals Volume 2 (NP 282) corrected by Section VI of the weekly edition of Admiralty Notices to Mariners.

The Date or Calendar Line is an arbitrary line, on either side of which the date differs by one day; when crossing this line on a westerly course, the date must be advanced one day; when crossing it on an easterly course, the date must be put back one day. The line is a modification of the line of the 180th meridian, and is drawn so as to include, as far as possible, islands of any one group, etc., on the same side of the line. It may be traced by starting at the South Pole and joining up to the following positions:

Lat	S	51°0	S	45°0	S	15°0	S	5°0	N	48°0	N	53°0	N	65°5
Long		180°0	W	172°5	W	172°5		180°0		180°0	E	170°0	W	169°0

thence through the middle of the Diomed Islands to Lat N 68°0, Long W 169°0, passing east of Ostrov Vrangelya (Wrangel Island) to Lat N 75°0, Long 180°0, and thence to the North Pole.

ACCURACY

24. *Main data.* The quantities tabulated in this Almanac are generally correct to the nearest 0.1; the exception is the Sun's GHA which is deliberately adjusted by up to 0.15 to reduce the error due to ignoring the *v*-correction. The GHA and Dec at intermediate times cannot be obtained to this precision, since at least two quantities must be added; moreover, the *v*- and *d*-corrections are based on mean values of *v* and *d* and are taken from tables for the whole minute only. The largest error that can occur in the GHA or Dec of any body other than the Sun or Moon is less than 0.2; it may reach 0.25 for the GHA of the Sun and 0.3 for that of the Moon.

In practice, it may be expected that only one third of the values of GHA and Dec taken out will have errors larger than 0.05 and less than one tenth will have errors larger than 0.1.

25. *Altitude corrections.* The errors in the altitude corrections are nominally of the same order as those in GHA and Dec, as they result from the addition of several quantities each correctly rounded off to 0.1. But the actual values of the dip and of the refraction at low altitudes may, in extreme atmospheric conditions, differ considerably from the mean values used in the tables.

USE OF THIS ALMANAC IN 2024

This Almanac may be used for the Sun and stars in 2024 in the following manner.

For the Sun, take out the GHA and Dec for the same date but, for January and February (for February 29 use March 1), for a time 5^h 48^m 00^s *earlier* and, for March to December, for a time 18^h 12^m 00^s *later* than the UT of observation; in both cases *add* 87° 00' to the GHA so obtained. The error, mainly due to planetary perturbations of the Earth, is unlikely to exceed 0.4.

For the stars, calculate the GHA and Dec for the same date and the same time, but for January and February (for February 29 use March 1) *subtract* 15.1 and for March to December *add* 44.0 to the GHA so found. The error due to incomplete correction for precession and nutation is unlikely to exceed 0.4. If preferred, the same result can be obtained by using a time 5^h 48^m 00^s *earlier* for January and February (for February 29 use March 1) and 18^h 12^m 00^s *later* for March to December, than the UT of observation (as for the Sun) and adding 86° 59.2 to the GHA (or adding 87° as for the Sun and subtracting 0.8, for precession, from the SHA of the star).

The Almanac cannot be so used for the Moon or planets.

LIST I — PLACES EAST ON UTC (mainly those EAST OF GREENWICH)

The times given } *added* to UTC to give Standard Time
below should be } *subtracted* from Standard Time to give UTC.

	h	m		h	m
Admiralty Islands	10		Denmark*†	01	
Afghanistan	04	30	Djibouti	03	
Albania*	01		Egypt, Arab Republic of	02	
Algeria	01		Equatorial Guinea, Republic of	01	
Amirante Islands	04		Bioko	01	
Andaman Islands	05	30	Eritrea	03	
Angola	01		Estonia*†	02	
Armenia	04		Eswatini	02	
Australia			Ethiopia	03	
Australian Capital Territory*	10		Fiji*	12	
New South Wales* ¹	10		Finland*†	02	
Northern Territory	09	30	France*†	01	
Queensland	10		Gabon	01	
South Australia*	09	30	Georgia	04	
Tasmania*	10		Germany*†	01	
Victoria*	10		Gibraltar*	01	
Western Australia	08		Greece*†	02	
Whitsunday Islands	10		Guam	10	
Austria*†	01		Hong Kong	08	
Azerbaijan	04		Hungary*†	01	
Bahrain	03		India	05	30
Balearic Islands*†	01		Indonesia, Republic of		
Bangladesh	06		Bangka, Billiton, Java, West and		
Belarus	03		Central Kalimantan, Madura, Sumatra	07	
Belgium*†	01		Bali, Flores, South, North and East		
Benin	01		Kalimantan, Lombok, Sulawesi,		
Bosnia and Herzegovina*	01		Sumba, Sumbawa, West Timor ...	08	
Botswana, Republic of	02		Aru, Irian Jaya, Kai, Moluccas		
Brunei	08		Tanimbar	09	
Bulgaria*†	02		Iran*	03	30
Burma (Myanmar)	06	30	Iraq	03	
Burundi	02		Israel*	02	
Cambodia	07		Italy*†	01	
Cameroon Republic	01		Jan Mayen Island*	01	
Caroline Islands ²	10		Japan	09	
Central African Republic	01		Jordan*	02	
Chad	01		Kazakhstan		
Chagos Archipelago & Diego Garcia	06		Western: Aktau, Uralsk, Atyrau ...	05	
Chatham Islands*	12	45	Eastern & Central: Astana	06	
China, People's Republic of	08		Kenya	03	
Christmas Island, Indian Ocean ...	07		Kerguelen Islands	05	
Cocos (Keeling) Islands	06	30	Kiribati Republic		
Comoro Islands (Comoros)	03		Gilbert Islands	12	
Congo, Democratic Republic			Phoenix Islands ³	13	
West: Kinshasa, Equateur	01		Line Islands ³	14	
East: Orientale, Kasai, Kivu, Shaba	02		Korea, North	09	
Congo Republic	01		Korea, South	09	
Corsica*†	01		Kuwait	03	
Crete*†	02		Kyrgyzstan	06	
Croatia*†	01		Laccadive Islands	05	30
Cyprus†: Ercan*, Larnaca*	02		Laos	07	
Czech Republic*†	01				

* Daylight-saving time may be kept in these places.

† For Summer time dates see List II footnotes.

¹ Except Broken Hill Area* which keeps 09^h 30^m.² Except Pohnpei, Pingelap and Kosrae which keep 11^h and Palau which keeps 09^h.³ The Line and Phoenix Is. not part of the Kiribati Republic may keep other time zones.

LIST I — (continued)

	h	m		h	m
Latvia*†	02		Norilsk, Krasnoyarsk, Dikson,		
Lebanon*	02		Novosibirsk, Tomsk	07	
Lesotho	02		Irkutsk, Bratsk, Ulan-Ude	08	
Libya	02		Tiksi, Yakutsk, Chita	09	
Liechtenstein*	01		Vladivostok, Khabarovsk, Okhotsk	10	
Lithuania*†	02		Severo-Kurilsk, Magadan,		
Lord Howe Island*	10	30	Sakhalin Island	11	
Luxembourg*†	01		Petropavlovsk-K., Anadyr	12	
Macau	08		Rwanda	02	
Macedonia*, former Yugoslav Republic	01		Ryukyu Islands	09	
Madagascar, Democratic Republic of	03		Samoa*	13	
Malawi	02		Santa Cruz Islands	11	
Malaysia, Malaya, Sabah, Sarawak	08		Sardinia*†	01	
Maldives, Republic of The	05		Saudi Arabia	03	
Malta*†	01		Schouten Islands	09	
Mariana Islands	10		Serbia*	01	
Marshall Islands	12		Seychelles	04	
Mauritius	04		Sicily*†	01	
Moldova*	02		Singapore	08	
Monaco*	01		Slovakia*†	01	
Mongolia ⁴	08		Slovenia*†	01	
Montenegro*	01		Socotra	03	
Morocco	01		Solomon Islands	11	
Mozambique	02		Somalia Republic	03	
Namibia	02		South Africa, Republic of	02	
Nauru	12		South Sudan	03	
Nepal	05	45	Spain*†	01	
Netherlands, The*†	01		Spanish Possessions in North Africa*	01	
New Caledonia	11		Spitsbergen (Svalbard)*	01	
New Zealand*	12		Sri Lanka	05	30
Nicobar Islands	05	30	Sudan, Republic of	02	
Niger	01		Sweden*†	01	
Nigeria, Republic of	01		Switzerland*	01	
Norfolk Island*	11		Syria (Syrian Arab Republic)*	02	
Norway*	01		Taiwan	08	
Novaya Zemlya	03		Tajikistan	05	
Okinawa	09		Tanzania	03	
Oman	04		Thailand	07	
Pagalu (Annobon Islands)	01		Timor-Leste	09	
Pakistan	05		Tonga	13	
Palau Islands	09		Tunisia	01	
Papua New Guinea ⁵	10		Turkey	03	
Pescadores Islands	08		Turkmenistan	05	
Philippine Republic	08		Tuvalu	12	
Poland*†	01		Uganda	03	
Qatar	03		Ukraine*	02	
Reunion	04		United Arab Emirates	04	
Romania*†	02		Uzbekistan	05	
Russia ⁶			Vanuatu, Republic of	11	
Kaliningrad	02		Vietnam, Socialist Republic of	07	
Moscow, St. Petersburg, Arkhangelsk	03		Yemen	03	
Samara, Astrakhan, Saratov,			Zambia, Republic of	02	
Volgograd	04		Zimbabwe	02	
Ekaterinburg, Ufa, Perm, Novyy Port	05				
Omsk	06				

* Daylight-saving time may be kept in these places.

† For Summer time dates see List II footnotes.

⁴ Western regions of Mongolia keep 07^h.⁵ Excluding the Autonomous Region of Bougainville which keeps 11^h.⁶ The boundaries between the zones are irregular; listed are chief towns in each zone.

LIST II — PLACES NORMALLY KEEPING UTC

Ascension Island	Ghana	Irish Republic*†	Portugal*†	Togo Republic
Burkina-Faso	Great Britain†	Ivory Coast	Principe	Tristan da Cunha
Canary Islands*†	Guinea-Bissau	Liberia	St. Helena	
Channel Islands†	Guinea Republic	Madeira*†	São Tomé	
Faeroes*, The	Iceland	Mali	Senegal	
Gambia, The	Ireland, Northern†	Mauritania	Sierra Leone	

* Daylight-saving time may be kept in these places.
† Summer time (daylight-saving time), one hour in advance of UTC, will be kept from 2023 March 26^d 01^h to October 29^d 01^h UTC (Ninth Summer Time Directive of the European Union). Ratification by member countries has not been verified.

LIST III — PLACES SLOW ON UTC (WEST OF GREENWICH)

The times given } *subtracted* from UTC to give Standard Time
below should be } *added* to Standard Time to give UTC.

	h m		h m
American Samoa	11	Canada (<i>continued</i>)	
Argentina	03	Prince Edward Island*	04
Austral (Tubuai) Islands ¹	10	Quebec, east of long. W. 63°	04
Azores*†	01	west of long. W. 63°*	05
Bahamas*	05	Saskatchewan	06
Barbados	04	Yukon	07
Belize	06	Cape Verde Islands	01
Bermuda*	04	Cayman Islands	05
Bolivia	04	Chile	
Brazil		General*	04
Fernando de Noronha I., Trindade I.,		Chilean Antarctic	03
Oceanic Is.	02	Colombia	05
N and NE coastal states, Tocantins,		Cook Islands	10
Minas Gerais, Goiás, Brasília,		Costa Rica	06
S and E coastal states	03	Cuba*	05
Amazonas ² , Mato Grosso do Sul,		Curaçao Island	04
Mato Grosso, Rondônia, Roraima	04	Dominican Republic	04
Acre	05	Easter Island (I. de Pascua)*	06
British Antarctic Territory ^{3,4}	03	Ecuador	05
Canada ^{4†}		El Salvador	06
Alberta*	07	Falkland Islands	03
British Columbia* ⁴	08	Fernando de Noronha Island	02
Labrador*	04	French Guiana	03
Manitoba*	06	Galápagos Islands	06
New Brunswick*	04	Greenland	
Newfoundland*	03 30	Danmarkshavn, Mesters Vig	00
Nunavut*		General*	03
east of long. W. 85°	05	Scoresby Sound*	01
long. W. 85° to W. 102°	06	Thule*, Pituffik*	04
west of long. W. 102°	07	Grenada	04
Northwest Territories*	07	Guadeloupe	04
Nova Scotia*	04	Guatemala	06
Ontario, east of long. W. 90°*	05	Guyana, Republic of	04
Ontario, west of long. W. 90°*	06		

* Daylight-saving time may be kept in these places. ‡ Dates for DST are given at the end of List III.
¹ This is the legal standard time, but local mean time is generally used.
² Except the cities of Eirunepe, Benjamin Constant and Tabatinga which keep 05^h.
³ Stations may use UTC.
⁴ Some areas may keep another time zone.

LIST III — (continued)

	h	m		h	m
Haiti*	05		United States of America [‡] (continued)		
Honduras	06		Idaho, southern part	07	
Jamaica	05		Idaho, northern part	08	
Johnston Island	10		Illinois	06	
Juan Fernandez Islands*	04		Indiana ⁶	05	
Leeward Islands	04		Iowa	06	
Marquesas Islands	09	30	Kansas ⁶	06	
Martinique	04		Kentucky, eastern part	05	
Mexico			Kentucky, western part	06	
General*	06		Louisiana	06	
Quintana Roo	05		Maine	05	
Baja California Sur*, Chihuahua*			Maryland	05	
Nayarit*, Sinaloa* and Sonora ...	07		Massachusetts	05	
Baja California Norte*	08		Michigan ⁶	05	
Midway Islands	11		Minnesota	06	
Nicaragua	06		Mississippi	06	
Niue	11		Missouri	06	
Panama, Republic of	05		Montana	07	
Paraguay*	04		Nebraska, eastern part	06	
Peru	05		Nebraska, western part	07	
Pitcairn Island	08		Nevada	08	
Puerto Rico	04		New Hampshire	05	
St. Pierre and Miquelon*	03		New Jersey	05	
Society Islands	10		New Mexico	07	
South Georgia	02		New York	05	
Suriname	03		North Carolina	05	
Trindade Island, South Atlantic ...	02		North Dakota, eastern part	06	
Trinidad and Tobago	04		North Dakota, western part	07	
Tuamotu Archipelago	10		Ohio	05	
Tubuai (Austral) Islands	10		Oklahoma	06	
Turks and Caicos Islands*	05		Oregon ⁶	08	
United States of America [‡]			Pennsylvania	05	
Alabama	06		Rhode Island	05	
Alaska	09		South Carolina	05	
Aleutian Islands, east of W. 169° 30'	09		South Dakota, eastern part	06	
Aleutian Islands, west of W. 169° 30'	10		South Dakota, western part	07	
Arizona ⁵	07		Tennessee, eastern part	05	
Arkansas	06		Tennessee, western part	06	
California	08		Texas ⁶	06	
Colorado	07		Utah	07	
Connecticut	05		Vermont	05	
Delaware	05		Virginia	05	
District of Columbia	05		Washington D.C.	05	
Florida ⁶	05		Washington	08	
Georgia	05		West Virginia	05	
Hawaii ⁵	10		Wisconsin	06	
			Wyoming	07	
			Uruguay	03	
			Venezuela	04	
			Virgin Islands	04	
			Windward Islands	04	

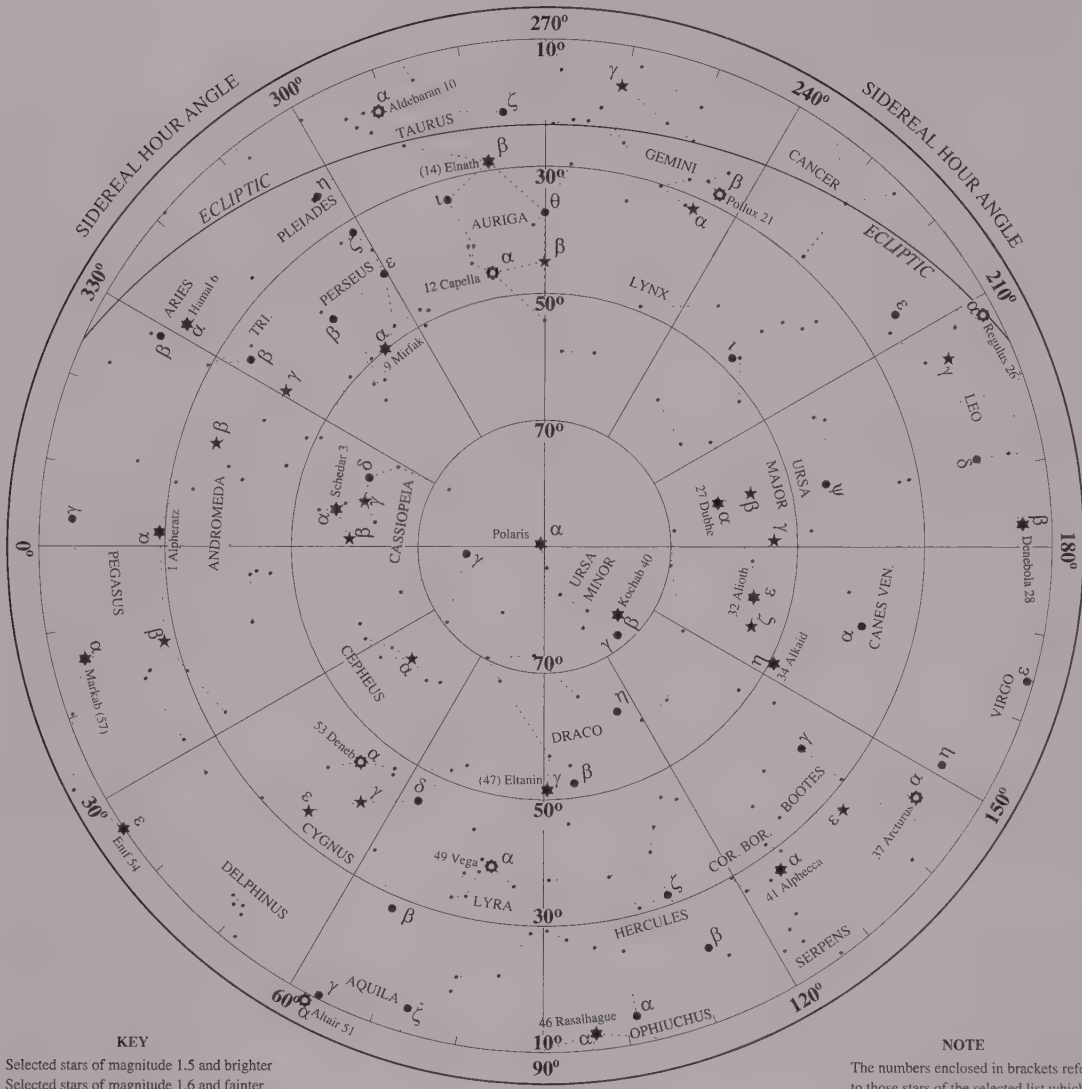
* Daylight-saving time may be kept in these places.

[‡] Daylight-saving (Summer) time, one hour fast on the time given, is kept during 2023 from March 12 (second Sunday) to November 5 (first Sunday), changing at 02^h 00^m local clock time.

⁵ Exempt from keeping daylight-saving time, except for a portion of Arizona.

⁶ A small portion of the state is in another time zone.

NORTHERN STARS



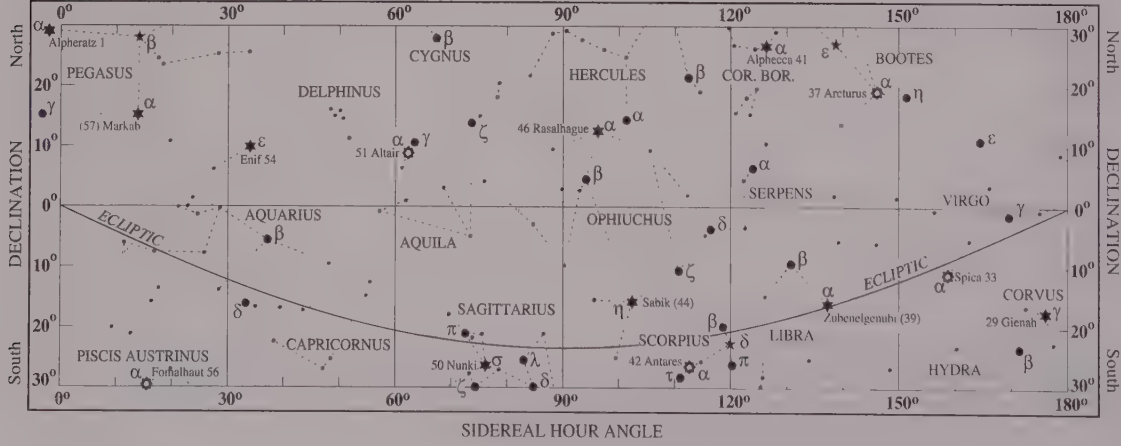
KEY

- Selected stars of magnitude 1.5 and brighter
- Selected stars of magnitude 1.6 and fainter
- Other tabulated stars of magnitude 2.5 and brighter
- Other tabulated stars of magnitude 2.6 and fainter
- Untabulated stars

NOTE

The numbers enclosed in brackets refer to those stars of the selected list which are not used in Sight Reduction Tables A.P. 3270, N.P. 303.

EQUATORIAL STARS (SHA 0° to 180°)



STARS TO 3RD MAGNITUDE

KEY

Selected stars of magnitude 1.5 and brighter
 Selected stars of magnitude 1.6 and fainter

NOTE

The numbers enclosed in brackets refer to those stars of the selected list which

This is a detailed astronomical chart of the winter sky, spanning from 180° to 360° in Sidereal Hour Angle (SHA) and from 30° North to 30° South in Declination. The chart includes a grid of Right Ascension (RA) and Declination (Dec) lines. The Ecliptic is shown as a curved line passing through the sky. Various constellations are labeled, including Leo, Cancer, Gemini, Taurus, Aries, Pegasus, Virgo, Hydra, Orion, Eridanus, and others. Numerous stars are plotted, with their names and magnitudes listed. Key stars include Denebola (28), Regulus (26), Rigel (11), and many others. The chart is designed to help observers identify stars and constellations in the winter sky.

Mag.	Name and Number	SHA							Declination						
			JAN.	FEB.	MAR.	APR.	MAY	JUNE		JAN.	FEB.	MAR.	APR.	MAY	JUNE
3·2	γ Cephei	4	56·7	57·2	57·4	57·1	56·5	55·7	N 77	45·9	45·8	45·6	45·5	45·4	45·4
2·5	α Pegasi	57 13	31·7	31·8	31·7	31·6	31·4	31·2	N 15	19·7	19·6	19·6	19·6	19·6	19·7
2·4	β Pegasi	13	47·0	47·1	47·0	46·9	46·7	46·4	N 28	12·5	12·4	12·3	12·3	12·3	12·4
1·2	α Piscis Aust.	56 15	16·6	16·6	16·5	16·4	16·2	15·9	S 29	30·3	30·2	30·1	30·0	29·9	29·8
2·1	β Gruis	18	59·9	59·9	59·9	59·7	59·4	59·1	S 46	46·1	46·0	45·9	45·8	45·6	45·5
2·9	α Tucanæ	24	59·6	59·7	59·5	59·3	58·9	58·5	S 60	09·0	08·8	08·7	08·5	08·4	08·3
1·7	α Gruis	55 27	35·4	35·3	35·2	35·0	34·7	34·4	S 46	51·2	51·1	51·0	50·9	50·7	50·7
2·9	δ Capricorni	32	55·8	55·8	55·7	55·5	55·2	55·0	S 16	01·5	01·5	01·5	01·4	01·3	01·2
2·4	ε Pegasi	54 33	40·7	40·7	40·6	40·4	40·2	39·9	N 9	58·8	58·7	58·7	58·7	58·7	58·8
2·9	β Aquarii	36	48·9	48·9	48·7	48·6	48·3	48·1	S 5	28·3	28·3	28·3	28·3	28·2	28·1
2·4	α Cephei	40	14·0	14·0	13·9	13·5	13·2	12·8	N 62	41·0	40·9	40·7	40·6	40·6	40·7
2·5	ε Cygni	48	13·4	13·3	13·2	13·0	12·7	12·5	N 34	03·3	03·2	03·1	03·1	03·1	03·3
1·3	α Cygni	53 49	27·4	27·3	27·2	26·9	26·6	26·4	N 45	21·7	21·6	21·5	21·4	21·5	21·6
3·1	α Indi	50 50	13·0	12·8	12·6	12·3	12·0	11·7	S 47	12·8	12·7	12·6	12·5	12·5	12·4
1·9	α Pavonis	52 53	08·9	08·8	08·5	08·1	07·7	07·3	S 56	39·8	39·7	39·5	39·5	39·4	39·4
2·2	γ Cygni	54	14·8	14·7	14·5	14·3	14·0	13·8	N 40	19·8	19·6	19·5	19·5	19·5	19·7
0·8	α Aquilæ	51 62	01·9	01·8	01·6	01·4	01·2	01·0	N 8	55·7	55·6	55·5	55·6	55·6	55·7
2·7	γ Aquilæ	63	10·2	10·1	09·9	09·7	09·4	09·2	N 10	40·1	40·0	39·9	40·0	40·0	40·1
2·9	δ Cygni	63	35·2	35·1	34·9	34·6	34·4	34·1	N 45	11·1	11·0	10·9	10·9	10·9	11·1
3·1	β Cygni	67	05·8	05·7	05·5	05·2	05·0	04·8	N 28	00·4	00·3	00·2	00·2	00·3	00·4
2·9	π Sagittarii	72	13·5	13·4	13·2	12·9	12·7	12·5	S 20	59·3	59·3	59·3	59·2	59·2	59·2
3·0	ζ Aquilæ	73	23·5	23·3	23·1	22·9	22·7	22·5	N 13	53·8	53·7	53·6	53·6	53·7	53·8
2·6	ζ Sagittarii	73	59·4	59·3	59·0	58·7	58·5	58·3	S 29	50·9	50·8	50·8	50·8	50·8	50·8
2·0	σ Sagittarii	50 75	50·2	50·0	49·8	49·5	49·2	49·0	S 26	16·1	16·1	16·1	16·1	16·0	16·0
0·0	α Lyræ	49 80	34·8	34·6	34·4	34·1	33·9	33·7	N 38	48·2	48·0	48·0	48·0	48·1	48·2
2·8	λ Sagittarii	82	39·7	39·5	39·2	39·0	38·7	38·5	S 25	24·5	24·5	24·5	24·5	24·5	24·5
1·9	ε Sagittarii	48 83	35·1	34·9	34·6	34·3	34·1	33·9	S 34	22·4	22·4	22·4	22·4	22·4	22·4
2·7	δ Sagittarii	84	23·5	23·3	23·1	22·8	22·6	22·4	S 29	49·1	49·1	49·1	49·1	49·1	49·1
3·0	γ Sagittarii	88	11·2	11·0	10·8	10·5	10·2	10·1	S 30	25·4	25·4	25·4	25·4	25·4	25·4
2·2	γ Draconis	47 90	43·4	43·2	42·9	42·6	42·4	42·3	N 51	29·0	28·8	28·8	28·8	28·9	29·1
2·8	β Ophiuchi	93	51·3	51·1	50·9	50·6	50·5	50·3	N 4	33·4	33·3	33·3	33·3	33·3	33·4
2·4	κ Scorpii	93	59·4	59·1	58·8	58·5	58·3	58·1	S 39	02·4	02·4	02·4	02·4	02·5	02·5
1·9	θ Scorpii	95	16·0	15·7	15·4	15·1	14·8	14·7	S 43	00·6	00·6	00·6	00·6	00·7	00·7
2·1	α Ophiuchi	46 95	60·4	60·2	60·0	59·7	59·5	59·4	N 12	32·5	32·4	32·4	32·4	32·5	32·5
1·6	λ Scorpii	45 96	13·0	12·7	12·4	12·1	11·9	11·7	S 37	07·2	07·1	07·1	07·2	07·2	07·2
3·0	α Aræ	96	36·3	36·0	35·7	35·3	35·0	34·8	S 49	53·5	53·5	53·5	53·5	53·6	53·6
2·7	ν Scorpii	96	55·6	55·3	55·1	54·8	54·5	54·4	S 37	18·8	18·7	18·8	18·8	18·8	18·9
2·8	β Draconis	97	16·2	16·0	15·7	15·4	15·1	15·0	N 52	16·8	16·7	16·6	16·7	16·8	17·0
2·8	β Aræ	98	12·5	12·1	11·8	11·4	11·1	10·9	S 55	32·9	32·9	32·9	32·9	33·0	33·1
Var.†	α Herculis	101	04·9	04·7	04·5	04·3	04·1	04·0	N 14	21·7	21·6	21·6	21·6	21·7	21·8
2·4	η Ophiuchi	44 102	05·0	04·7	04·5	04·2	04·1	03·9	S 15	45·2	45·2	45·3	45·3	45·3	45·2
3·1	ζ Aræ	104	52·8	52·4	52·0	51·6	51·3	51·1	S 56	01·4	01·4	01·4	01·4	01·5	01·6
2·3	ε Scorpii	107	05·6	05·4	05·1	04·8	04·6	04·5	S 34	20·0	20·0	20·0	20·1	20·1	20·2
1·9	α Triang. Aust.	43 107	14·3	13·7	13·1	12·6	12·2	11·9	S 69	03·9	03·9	03·9	04·0	04·1	04·2
2·8	ζ Herculis	109	28·1	27·8	27·6	27·4	27·2	27·1	N 31	33·5	33·4	33·3	33·4	33·5	33·6
2·6	ζ Ophiuchi	110	24·0	23·7	23·5	23·3	23·1	23·0	S 10	36·8	36·9	36·9	36·9	36·9	36·9
2·8	τ Scorpii	110	40·7	40·4	40·2	39·9	39·7	39·6	S 28	15·7	15·8	15·8	15·8	15·9	15·9
2·8	β Herculis	112	12·2	12·0	11·7	11·5	11·4	11·3	N 21	26·2	26·1	26·1	26·1	26·2	26·3
1·0	α Scorpii	42 112	18·1	17·9	17·6	17·4	17·2	17·1	S 26	28·9	28·9	29·0	29·0	29·0	29·1
2·7	η Draconis	113	55·8	55·5	55·1	54·8	54·6	54·6	N 61	27·4	27·3	27·3	27·4	27·5	27·7
2·7	δ Ophiuchi	116	07·1	06·8	06·6	06·4	06·3	06·2	S 3	45·2	45·3	45·3	45·4	45·3	45·3
2·6	β Scorpii	118	18·7	18·5	18·2	18·0	17·9	17·8	S 19	52·0	52·1	52·1	52·2	52·2	52·2
2·3	δ Scorpii	119	34·9	34·7	34·4	34·2	34·1	34·0	S 22	41·2	41·2	41·3	41·3	41·3	41·3
2·9	π Scorpii	119	56·7	56·4	56·2	55·9	55·8	55·7	S 26	10·7	10·8	10·8	10·9	10·9	10·9
2·8	β Trianguli Aust.	120	42·9	42·5	42·0	41·6	41·3	41·2	S 63	29·8	29·8	29·9	30·0	30·1	30·2
2·6	α Serpentis	123	39·3	39·0	38·8	38·6	38·5	38·5	N 6	21·1	21·0	21·0	21·0	21·1	21·1
2·8	γ Lupi	125	50·2	49·9	49·7	49·4	49·3	49·2	S 41	14·4	14·5	14·6	14·6	14·7	14·8
2·2	α Coronæ Bor.	41 126	05·3	05·1	04·9	04·7	04·6	04·5	N 26	38·1	38·0	38·0	38·0	38·1	38·2

† 2·9 — 3·6

Mag.	Name and Number	SHA							Declination						
			JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
		°	'	'	'	'	'	'	°	'	'	'	'	'	'
3.2	<i>Errai</i>	4	54.9	54.4	54.1	54.3	54.7	55.3	N 77	45.5	45.6	45.8	46.0	46.2	46.2
2.5	<i>Markab</i>	57	13	30.9	30.8	30.7	30.7	30.8	N 15	19.8	20.0	20.0	20.1	20.1	20.1
2.4	<i>Scheat</i>		13	46.2	46.0	45.9	46.0	46.1	N 28	12.5	12.6	12.8	12.8	12.9	12.9
1.2	<i>Fomalhaut</i>	56	15	15.6	15.4	15.4	15.5	15.6	S 29	29.7	29.7	29.8	29.8	29.9	29.9
2.1	<i>Tiaki</i>		18	58.8	58.5	58.5	58.5	58.8	S 46	45.5	45.6	45.6	45.7	45.8	45.8
2.9	α <i>Tucanæ</i>		24	58.1	57.8	57.7	57.9	58.1	S 60	08.3	08.4	08.5	08.7	08.7	08.7
1.7	<i>Alnair</i>	55	27	34.1	33.9	33.8	33.9	34.1	S 46	50.7	50.7	50.8	50.9	51.0	51.0
2.9	<i>Deneb Algedi</i>		32	54.8	54.6	54.6	54.7	54.8	S 16	01.2	01.1	01.1	01.2	01.2	01.2
2.4	<i>Enif</i>	54	33	39.7	39.6	39.6	39.7	39.8	N 9	58.9	59.0	59.1	59.1	59.1	59.1
2.9	<i>Sadalsuud</i>		36	47.9	47.8	47.8	47.8	47.9	S 5	28.0	28.0	28.0	28.0	28.0	28.0
2.4	<i>Alderamin</i>		40	12.5	12.4	12.5	12.8	13.1	N 62	40.9	41.1	41.3	41.4	41.4	41.4
2.5	<i>Aljanah</i>		48	12.3	12.2	12.3	12.4	12.6	N 34	03.4	03.6	03.7	03.8	03.8	03.7
1.3	<i>Deneb</i>	53	49	26.2	26.1	26.2	26.4	26.6	N 45	21.8	21.9	22.1	22.1	22.1	22.1
3.1	α <i>Indi</i>		50	11.4	11.3	11.4	11.5	11.7	S 47	12.5	12.5	12.6	12.7	12.7	12.7
1.9	<i>Peacock</i>	52	53	07.1	07.0	07.0	07.2	07.5	S 56	39.5	39.6	39.7	39.7	39.7	39.7
2.2	<i>Sadr</i>		54	13.6	13.6	13.7	13.8	14.0	N 40	19.8	20.0	20.1	20.2	20.2	20.1
0.8	<i>Altair</i>	51	62	00.8	00.8	00.8	01.0	01.1	N 8	55.8	55.9	56.0	56.0	56.0	55.9
2.7	γ <i>Aquilæ</i>		63	09.1	09.1	09.1	09.3	09.4	N 10	40.2	40.3	40.4	40.4	40.4	40.3
2.9	<i>Fawaris</i>		63	34.0	34.0	34.2	34.4	34.6	N 45	11.2	11.4	11.5	11.6	11.5	11.4
3.1	<i>Albireo</i>		67	04.7	04.7	04.8	04.9	05.1	N 28	00.5	00.7	00.7	00.8	00.7	00.6
2.9	<i>Albaldah</i>		72	12.3	12.3	12.4	12.5	12.6	S 20	59.1	59.1	59.2	59.2	59.2	59.2
3.0	ζ <i>Aquilæ</i>		73	22.4	22.4	22.5	22.6	22.7	N 13	53.9	54.0	54.1	54.1	54.0	54.0
2.6	<i>Ascella</i>		73	58.1	58.1	58.2	58.3	58.5	S 29	50.8	50.8	50.8	50.8	50.8	50.8
2.0	<i>Nunki</i>	50	75	48.9	48.9	49.0	49.1	49.2	S 26	16.0	16.0	16.1	16.1	16.1	16.1
0.0	<i>Vega</i>	49	80	33.6	33.7	33.8	34.0	34.2	N 38	48.4	48.5	48.6	48.6	48.5	48.4
2.8	<i>Kaus Borealis</i>		82	38.4	38.4	38.5	38.7	38.8	S 25	24.5	24.5	24.5	24.6	24.5	24.5
1.9	<i>Kaus Australis</i>	48	83	33.8	33.8	33.9	34.0	34.1	S 34	22.4	22.4	22.5	22.5	22.5	22.4
2.7	<i>Kaus Media</i>		84	22.3	22.3	22.4	22.5	22.6	S 29	49.1	49.1	49.1	49.1	49.1	49.1
3.0	<i>Alnasl</i>		88	10.0	10.0	10.1	10.3	10.3	S 30	25.4	25.5	25.5	25.5	25.5	25.4
2.2	<i>Eltanin</i>	47	90	42.3	42.4	42.6	42.9	43.1	N 51	29.2	29.3	29.4	29.4	29.3	29.1
2.8	<i>Cebalrai</i>		93	50.3	50.3	50.4	50.5	50.6	N 4	33.5	33.5	33.6	33.6	33.5	33.4
2.4	κ <i>Scorpii</i>		93	58.0	58.1	58.2	58.4	58.4	S 39	02.5	02.6	02.6	02.6	02.6	02.5
1.9	<i>Sargas</i>		95	14.6	14.6	14.8	15.0	15.1	S 43	00.8	00.9	00.9	00.9	00.8	00.7
2.1	<i>Rasalhague</i>	46	95	59.4	59.4	59.6	59.7	59.7	N 12	32.6	32.7	32.7	32.7	32.6	32.6
1.6	<i>Shaula</i>	45	96	11.7	11.7	11.8	12.0	12.1	S 37	07.3	07.3	07.3	07.3	07.3	07.2
3.0	α <i>Aræ</i>		96	34.8	34.8	35.0	35.2	35.3	S 49	53.7	53.8	53.8	53.8	53.7	53.7
2.7	<i>Lesath</i>		96	54.3	54.3	54.5	54.6	54.7	S 37	18.9	18.9	19.0	18.9	18.9	18.9
2.8	<i>Rastaban</i>		97	15.1	15.2	15.5	15.7	15.9	N 52	17.1	17.2	17.3	17.2	17.1	16.9
2.8	β <i>Aræ</i>		98	10.8	10.9	11.1	11.3	11.4	S 55	33.2	33.3	33.3	33.3	33.2	33.1
Var.‡	<i>Rasalgethi</i>		101	04.0	04.0	04.2	04.3	04.4	N 14	21.9	21.9	22.0	21.9	21.9	21.8
2.4	<i>Sabik</i>	44	102	03.9	03.9	04.1	04.2	04.2	S 15	45.2	45.2	45.2	45.2	45.2	45.2
3.1	ζ <i>Aræ</i>		104	51.1	51.2	51.5	51.7	51.8	S 56	01.7	01.8	01.8	01.8	01.7	01.6
2.3	<i>Larawag</i>		107	04.5	04.5	04.7	04.8	04.9	S 34	20.2	20.2	20.2	20.2	20.2	20.1
1.9	<i>Atria</i>	43	107	11.9	12.2	12.6	12.9	13.1	S 69	04.3	04.4	04.4	04.4	04.3	04.1
2.8	ζ <i>Herculis</i>		109	27.1	27.3	27.4	27.6	27.6	N 31	33.7	33.8	33.8	33.7	33.6	33.5
2.6	ζ <i>Ophiuchi</i>		110	23.0	23.1	23.2	23.3	23.3	S 10	36.9	36.8	36.8	36.8	36.9	36.9
2.8	<i>Paikauhale</i>		110	39.6	39.7	39.8	39.9	40.0	S 28	15.9	15.9	15.9	15.9	15.9	15.9
2.8	<i>Kornephoros</i>		112	11.3	11.4	11.6	11.7	11.7	N 21	26.4	26.5	26.5	26.4	26.3	26.2
1.0	<i>Antares</i>	42	112	17.1	17.1	17.3	17.4	17.4	S 26	29.1	29.1	29.1	29.1	29.0	29.0
2.7	<i>Athebyne</i>		113	54.7	55.0	55.3	55.6	55.8	N 61	27.8	27.9	27.9	27.8	27.6	27.4
2.7	<i>Yed Prior</i>		116	06.2	06.2	06.4	06.5	06.5	S 3	45.2	45.2	45.2	45.2	45.3	45.3
2.6	<i>Acrab</i>		118	17.8	17.9	18.0	18.1	18.1	S 19	52.2	52.2	52.2	52.2	52.2	52.2
2.3	<i>Dschubba</i>		119	34.0	34.1	34.2	34.3	34.3	S 22	41.4	41.4	41.3	41.3	41.3	41.3
2.9	<i>Fang</i>		119	55.7	55.8	55.9	56.0	56.0	S 26	10.9	11.0	10.9	10.9	10.9	10.9
2.8	β <i>Trianguli Aust.</i>		120	41.3	41.5	41.8	42.1	42.1	S 63	30.3	30.4	30.4	30.3	30.2	30.1
2.6	<i>Unukalhai</i>		123	38.5	38.6	38.7	38.8	38.8	N 6	21.2	21.2	21.2	21.2	21.1	21.0
2.8	γ <i>Lupi</i>		125	49.2	49.3	49.5	49.6	49.6	S 41	14.9	14.9	14.8	14.8	14.7	14.7
2.2	<i>Alphecca</i>	41	126	04.6	04.7	04.8	04.9	05.0	N 26	38.3	38.3	38.3	38.3	38.1	38.0

‡ 2.9 – 3.6

Mag.	Name and Number	SHA							Declination						
			JAN.	FEB.	MAR.	APR.	MAY	JUNE		JAN.	FEB.	MAR.	APR.	MAY	JUNE
		°	'	'	'	'	'	'	°	'	'	'	'	'	'
2·9	γ Trianguli Aust.	129	44·5	43·9	43·4	42·9	42·7	42·7	S 68	45·5	45·5	45·6	45·8	45·9	46·1
3·1	γ Ursæ Minoris	129	49·6	49·1	48·6	48·2	48·1	48·2	N 71	44·8	44·7	44·7	44·8	45·0	45·2
2·6	β Libræ	130	26·6	26·3	26·1	25·9	25·8	25·8	S 9	28·0	28·1	28·2	28·2	28·2	28·2
2·7	β Lupi	134	59·7	59·4	59·1	58·9	58·8	58·7	S 43	13·4	13·4	13·5	13·6	13·7	13·8
2·8	α Libræ 39	136	58·0	57·7	57·5	57·3	57·2	57·2	S 16	08·2	08·2	08·3	08·4	08·4	08·4
2·1	β Ursæ Minoris 40	137	20·2	19·6	19·0	18·6	18·6	18·8	N 74	03·3	03·3	03·3	03·5	03·6	03·7
2·4	ε Bootis	138	30·3	30·1	29·9	29·7	29·6	29·6	N 26	58·5	58·4	58·4	58·5	58·6	58·7
2·3	α Lupi	139	08·4	08·0	07·7	07·5	07·4	07·4	S 47	29·0	29·0	29·1	29·3	29·4	29·5
—0·3	α Centauri 38	139	42·7	42·3	41·9	41·7	41·6	41·6	S 60	55·5	55·5	55·7	55·8	55·9	56·1
2·3	η Centauri	140	45·7	45·4	45·1	44·9	44·8	44·8	S 42	15·3	15·4	15·5	15·6	15·7	15·8
3·0	γ Bootis	141	45·1	44·8	44·6	44·4	44·4	44·4	N 38	12·2	12·2	12·2	12·3	12·4	12·5
0·0	α Bootis	145	49·5	49·2	49·0	48·9	48·9	48·9	N 19	03·6	03·6	03·5	03·6	03·6	03·7
2·1	θ Centauri 36	147	59·6	59·3	59·1	59·0	58·9	58·9	S 36	28·8	28·9	29·0	29·1	29·2	29·2
0·6	β Centauri 35	148	38·4	38·0	37·7	37·5	37·4	37·5	S 60	28·7	28·8	28·9	29·1	29·2	29·3
2·6	ζ Centauri	150	45·5	45·2	44·9	44·8	44·7	44·8	S 47	23·8	23·9	24·1	24·2	24·3	24·4
2·7	η Bootis	151	03·4	03·2	03·0	02·9	02·8	02·9	N 18	16·8	16·8	16·7	16·8	16·9	16·9
1·9	η Ursæ Majoris 34	152	53·3	53·0	52·8	52·7	52·7	52·8	N 49	11·6	11·6	11·7	11·8	11·9	12·0
2·3	ε Centauri	154	39·9	39·6	39·3	39·1	39·1	39·2	S 53	34·7	34·8	34·9	35·1	35·2	35·3
1·0	α Virginis 33	158	24·0	23·8	23·6	23·5	23·5	23·5	S 11	16·8	16·9	17·0	17·0	17·1	17·0
2·3	ζ Ursæ Majoris	158	47·2	46·9	46·6	46·5	46·5	46·7	N 54	48·0	48·0	48·1	48·2	48·4	48·5
2·8	ι Centauri	159	31·7	31·5	31·3	31·2	31·2	31·2	S 36	49·8	49·9	50·0	50·2	50·2	50·3
2·8	ε Virginis	164	10·2	10·0	09·9	09·8	09·8	09·8	N 10	50·1	50·0	50·0	50·0	50·0	50·1
2·9	α Canum Venat.	165	43·5	43·2	43·0	42·9	43·0	43·1	N 38	11·4	11·4	11·5	11·6	11·7	11·7
1·8	ε Ursæ Majoris 32	166	14·3	14·0	13·8	13·7	13·8	13·9	N 55	49·8	49·8	49·9	50·0	50·2	50·3
1·3	β Crucis	167	44·0	43·6	43·4	43·3	43·4	43·5	S 59	48·6	48·7	48·8	49·0	49·2	49·2
2·9	γ Virginis	169	17·7	17·4	17·3	17·2	17·3	17·3	S 1	34·5	34·6	34·7	34·7	34·7	34·7
2·2	γ Centauri	169	18·2	17·9	17·7	17·7	17·7	17·8	S 49	04·9	05·0	05·2	05·3	05·5	05·5
2·7	α Muscæ	170	21·5	21·0	20·8	20·7	20·8	21·1	S 69	15·4	15·5	15·7	15·9	16·0	16·1
2·7	β Corvi	171	06·1	05·9	05·7	05·7	05·7	05·7	S 23	31·3	31·4	31·5	31·6	31·7	31·7
1·6	γ Crucis 31	171	53·3	53·0	52·8	52·7	52·8	53·0	S 57	14·2	14·4	14·5	14·7	14·8	14·9
1·3	α Crucis 30	173	01·7	01·3	01·1	01·0	01·2	01·4	S 63	13·3	13·4	13·6	13·8	13·9	14·0
2·6	γ Corvi 29	175	45·2	45·0	44·8	44·8	44·8	44·9	S 17	40·1	40·2	40·3	40·4	40·4	40·4
2·6	δ Centauri	177	36·7	36·4	36·3	36·2	36·3	36·5	S 50	50·8	50·9	51·1	51·2	51·3	51·4
2·4	γ Ursæ Majoris	181	14·3	14·0	13·8	13·8	13·9	14·1	N 53	33·8	33·8	33·9	34·0	34·1	34·2
2·1	β Leonis 28	182	26·5	26·3	26·2	26·1	26·2	26·3	N 14	26·5	26·5	26·5	26·5	26·5	26·6
2·6	δ Leonis	191	10·0	09·8	09·7	09·7	09·8	09·8	N 20	23·8	23·7	23·7	23·8	23·8	23·9
3·0	ψ Ursæ Majoris	192	15·5	15·3	15·2	15·2	15·3	15·5	N 44	22·2	22·3	22·3	22·4	22·5	22·6
1·8	α Ursæ Majoris 27	193	42·6	42·3	42·2	42·3	42·5	42·7	N 61	37·4	37·5	37·6	37·7	37·8	37·8
2·4	β Ursæ Majoris	194	11·4	11·1	11·0	11·1	11·2	11·5	N 56	15·3	15·4	15·5	15·6	15·7	15·7
2·7	μ Velorum	198	03·4	03·2	03·2	03·3	03·4	03·6	S 49	32·3	32·5	32·6	32·8	32·8	32·8
2·8	θ Carinæ	199	03·0	02·8	02·8	03·0	03·2	03·5	S 64	30·6	30·8	31·0	31·2	31·2	31·3
2·3	γ Leonis	204	41·3	41·1	41·1	41·1	41·2	41·3	N 19	43·4	43·4	43·4	43·5	43·5	43·5
1·4	α Leonis 26	207	35·9	35·8	35·8	35·8	35·9	36·0	N 11	51·2	51·2	51·2	51·2	51·2	51·3
3·0	ε Leonis	213	12·5	12·4	12·4	12·4	12·5	12·6	N 23	40·0	40·0	40·0	40·1	40·1	40·1
3·1	N Velorum	217	00·8	00·8	00·8	01·0	01·3	01·5	S 57	08·0	08·2	08·3	08·4	08·5	08·4
2·0	α Hydræ 25	217	49·1	49·0	49·0	49·1	49·2	49·2	S 8	45·5	45·6	45·6	45·7	45·7	45·6
2·5	κ Velorum	219	17·3	17·2	17·3	17·5	17·7	17·9	S 55	06·4	06·5	06·7	06·8	06·8	06·8
2·2	ι Carinæ	220	34·0	34·0	34·1	34·3	34·6	34·8	S 59	22·1	22·3	22·5	22·6	22·6	22·6
1·7	β Carinæ 24	221	37·7	37·7	37·9	38·3	38·7	39·1	S 69	48·5	48·7	48·9	49·0	49·0	49·0
2·2	λ Velorum 23	222	47·1	47·0	47·1	47·2	47·4	47·6	S 43	31·4	31·6	31·7	31·8	31·8	31·8
3·1	ι Ursæ Majoris	224	48·0	47·9	47·9	48·1	48·3	48·4	N 47	57·0	57·1	57·1	57·2	57·2	57·2
2·0	δ Velorum	228	39·5	39·5	39·6	39·9	40·1	40·3	S 54	47·5	47·6	47·8	47·9	47·9	47·8
1·9	ε Carinæ 22	234	14·7	14·8	14·9	15·2	15·5	15·8	S 59	34·9	35·1	35·2	35·3	35·3	35·2
1·8	γ Velorum	237	26·0	26·0	26·1	26·4	26·6	26·7	S 47	24·2	24·4	24·5	24·5	24·5	24·4
2·8	ρ Puppis	237	51·9	51·9	51·9	52·1	52·2	52·3	S 24	22·2	22·3	22·4	22·5	22·4	22·4
2·3	ζ Puppis	238	53·8	53·8	53·9	54·1	54·3	54·4	S 40	04·0	04·2	04·3	04·3	04·3	04·2
1·1	β Geminorum 21	243	18·9	18·9	19·0	19·1	19·2	19·2	N 27	58·2	58·2	58·2	58·3	58·3	58·3
0·4	α Canis Minoris 20	244	52·2	52·2	52·3	52·4	52·5	52·5	N 5	09·9	09·9	09·9	09·9	09·9	09·9

Mag.	Name and Number		SHA							Declination						
				JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
			°	'	'	'	'	'	'	°	'	'	'	'	'	'
2·9	γ Trianguli Aust.		129	42·8	43·2	43·5	43·8	43·8	43·5	S 68	46·2	46·2	46·2	46·1	45·9	45·8
3·1	Pherkad		129	48·6	49·1	49·6	50·0	50·2	50·0	N 71	45·2	45·3	45·2	45·1	44·9	44·7
2·6	Zubeneschamali		130	25·8	25·9	26·0	26·1	26·1	25·9	S 9	28·2	28·1	28·1	28·1	28·2	28·2
2·7	β Lupi		134	58·8	58·9	59·1	59·2	59·1	58·9	S 43	13·8	13·9	13·8	13·7	13·7	13·6
2·8	Zubenelgenubi	39	136	57·3	57·3	57·4	57·5	57·5	57·3	S 16	08·4	08·4	08·3	08·3	08·3	08·4
2·1	Kochab	40	137	19·3	19·9	20·4	20·8	20·9	20·7	N 74	03·8	03·8	03·7	03·6	03·4	03·2
2·4	Izar		138	29·7	29·8	30·0	30·0	30·0	29·8	N 26	58·7	58·8	58·7	58·6	58·5	58·4
2·3	α Lupi		139	07·5	07·6	07·8	07·9	07·8	07·6	S 47	29·5	29·5	29·4	29·4	29·3	29·2
−0·3	Rigil Kent.	38	139	41·8	42·0	42·3	42·4	42·3	42·1	S 60	56·1	56·1	56·1	56·0	55·8	55·8
2·3	η Centauri		140	44·9	45·0	45·2	45·3	45·2	45·0	S 42	15·8	15·8	15·7	15·7	15·6	15·6
3·0	Seginus		141	44·5	44·7	44·8	44·9	44·8	44·7	N 38	12·6	12·6	12·5	12·4	12·2	12·1
0·0	Arcturus	37	145	49·0	49·1	49·2	49·2	49·1	49·0	N 19	03·8	03·8	03·7	03·7	03·6	03·4
2·1	Menkent	36	147	59·0	59·1	59·2	59·3	59·2	59·0	S 36	29·3	29·2	29·2	29·1	29·1	29·1
0·6	Hadar	35	148	37·6	37·9	38·1	38·2	38·1	37·7	S 60	29·4	29·4	29·3	29·2	29·1	29·0
2·6	ζ Centauri		150	44·9	45·0	45·2	45·2	45·1	44·8	S 47	24·4	24·4	24·3	24·2	24·1	24·1
2·7	Muphrid		151	02·9	03·0	03·1	03·2	03·1	02·9	N 18	17·0	17·0	16·9	16·9	16·7	16·6
1·9	Alkaid	34	152	52·9	53·1	53·2	53·3	53·2	53·0	N 49	12·1	12·0	11·9	11·8	11·6	11·4
2·3	ε Centauri		154	39·3	39·5	39·7	39·7	39·6	39·3	S 53	35·3	35·3	35·2	35·1	35·0	35·0
1·0	Spica	33	158	23·6	23·7	23·7	23·7	23·6	23·4	S 11	17·0	17·0	17·0	17·0	17·0	17·1
2·3	Mizar		158	46·9	47·1	47·2	47·3	47·2	46·9	N 54	48·5	48·4	48·3	48·2	48·0	47·8
2·8	ι Centauri		159	31·3	31·4	31·5	31·5	31·4	31·1	S 36	50·3	50·3	50·2	50·1	50·1	50·1
2·8	Vindemiatrix		164	09·9	10·0	10·0	10·0	09·9	09·7	N 10	50·1	50·1	50·1	50·0	49·9	49·8
2·9	Cor Caroli		165	43·2	43·3	43·4	43·4	43·2	43·0	N 38	11·8	11·7	11·6	11·5	11·3	11·2
1·8	Alioth	32	166	14·1	14·3	14·4	14·4	14·3	14·0	N 55	50·3	50·2	50·1	49·9	49·7	49·6
1·3	Mimosa		167	43·7	44·0	44·1	44·1	43·9	43·5	S 59	49·3	49·2	49·1	49·0	48·9	48·8
2·9	Porrina		169	17·4	17·4	17·5	17·4	17·3	17·1	S 1	34·6	34·6	34·6	34·6	34·7	34·8
2·2	Muhlifain		169	18·0	18·1	18·2	18·2	18·0	17·7	S 49	05·5	05·4	05·3	05·2	05·2	05·2
2·7	α Muscæ		170	21·4	21·8	22·0	22·0	21·6	21·1	S 69	16·1	16·1	16·0	15·8	15·7	15·7
2·7	Kraz		171	05·8	05·9	05·9	05·9	05·8	05·5	S 23	31·6	31·6	31·5	31·5	31·5	31·6
1·6	Gacrux	31	171	53·2	53·4	53·5	53·4	53·2	52·8	S 57	14·9	14·8	14·7	14·6	14·5	14·5
1·3	Acrux	30	173	01·6	01·9	02·0	02·0	01·7	01·3	S 63	14·0	13·9	13·8	13·7	13·6	13·6
2·6	Gienah	29	175	45·0	45·0	45·1	45·0	44·8	44·6	S 17	40·4	40·3	40·3	40·2	40·3	40·3
2·6	δ Centauri		177	36·6	36·8	36·8	36·8	36·5	36·2	S 50	51·4	51·3	51·2	51·1	51·0	51·0
2·4	Phecda		181	14·3	14·4	14·4	14·3	14·1	13·8	N 53	34·2	34·1	33·9	33·8	33·6	33·5
2·1	Denebola	28	182	26·3	26·4	26·4	26·3	26·1	25·9	N 14	26·6	26·6	26·6	26·5	26·4	26·3
2·6	Zosma		191	09·9	09·9	09·9	09·8	09·6	09·3	N 20	23·9	23·9	23·8	23·7	23·6	23·5
3·0	ψ Ursæ Majoris		192	15·6	15·6	15·6	15·5	15·2	14·9	N 44	22·5	22·4	22·3	22·2	22·0	21·9
1·8	Dubhe	27	193	42·9	43·0	43·0	42·8	42·5	42·0	N 61	37·8	37·6	37·5	37·3	37·2	37·1
2·4	Merak		194	11·6	11·7	11·6	11·5	11·2	10·8	N 56	15·7	15·6	15·4	15·3	15·1	15·0
2·7	μ Velorum		198	03·8	03·8	03·8	03·7	03·4	03·0	S 49	32·8	32·7	32·5	32·4	32·4	32·5
2·8	θ Carinæ		199	03·8	04·0	04·0	03·8	03·4	02·9	S 64	31·2	31·1	30·9	30·8	30·8	30·8
2·3	Algieba		204	41·3	41·3	41·3	41·1	40·9	40·6	N 19	43·5	43·5	43·4	43·4	43·3	43·2
1·4	Regulus	26	207	36·0	36·0	35·9	35·8	35·5	35·3	N 11	51·3	51·3	51·2	51·2	51·1	51·0
3·0	ε Leonis		213	12·6	12·6	12·5	12·3	12·1	11·8	N 23	40·1	40·1	40·0	40·0	39·9	39·8
3·1	N Velorum		217	01·7	01·7	01·6	01·4	01·0	00·6	S 57	08·3	08·2	08·0	08·0	08·0	08·1
2·0	Alphard	25	217	49·3	49·2	49·1	49·0	48·7	48·5	S 8	45·6	45·5	45·5	45·5	45·5	45·6
2·5	Markeb		219	18·1	18·1	18·0	17·7	17·4	17·0	S 55	06·7	06·6	06·4	06·3	06·3	06·5
2·2	Aspidiske		220	35·0	35·0	34·9	34·6	34·2	33·9	S 59	22·5	22·3	22·2	22·1	22·1	22·2
1·7	Miaplacidus	24	221	39·4	39·5	39·3	38·9	38·4	37·9	S 69	48·9	48·7	48·6	48·5	48·5	48·6
2·2	Suhail	23	222	47·6	47·6	47·5	47·3	47·0	46·7	S 43	31·7	31·5	31·4	31·3	31·4	31·5
3·1	Talitha		224	48·4	48·3	48·1	47·9	47·5	47·2	N 47	57·1	57·0	56·9	56·8	56·7	56·7
2·0	Alsephina		228	40·4	40·4	40·2	40·0	39·6	39·3	S 54	47·7	47·5	47·4	47·3	47·4	47·5
1·9	Avior	22	234	15·9	15·8	15·6	15·3	14·9	14·6	S 59	35·1	34·9	34·8	34·7	34·8	34·9
1·8	γ Velorum		237	26·8	26·7	26·5	26·2	25·9	25·7	S 47	24·3	24·1	24·0	24·0	24·0	24·2
2·8	Tureis		237	52·3	52·2	52·0	51·8	51·6	51·3	S 24	22·3	22·1	22·1	22·1	22·1	22·2
2·3	Naos		238	54·4	54·3	54·1	53·9	53·6	53·4	S 40	04·1	04·0	03·9	03·8	03·9	04·0
1·1	Pollux	21	243	19·2	19·1	18·9	18·6	18·3	18·1	N 27	58·2	58·2	58·2	58·1	58·1	58·0
0·4	Procyon	20	244	52·5	52·3	52·2	51·9	51·7	51·5	N 5	10·0	10·0	10·0	10·0	09·9	09·8

Mag.	Name and Number	SHA							Declination						
			JAN.	FEB.	MAR.	APR.	MAY	JUNE		JAN.	FEB.	MAR.	APR.	MAY	JUNE
		°	'	'	'	'	'	'	°	'	'	'	'	'	'
1·6	α Geminorum	245	58·8	58·8	58·8	59·0	59·1	59·1	N 31	50·2	50·2	50·3	50·3	50·3	50·3
3·3	σ Puppis	247	30·2	30·3	30·4	30·6	30·8	30·9	S 43	20·9	21·0	21·1	21·1	21·1	21·0
2·9	β Canis Minoris	247	53·8	53·8	53·9	54·0	54·1	54·1	N 8	14·5	14·5	14·5	14·5	14·5	14·6
2·4	η Canis Majoris	248	44·6	44·7	44·8	44·9	45·1	45·1	S 29	20·9	21·0	21·1	21·1	21·1	21·0
2·7	π Puppis	250	30·4	30·4	30·5	30·7	30·9	30·9	S 37	08·3	08·5	08·6	08·6	08·5	08·4
1·8	δ Canis Majoris	252	39·8	39·9	40·0	40·1	40·2	40·3	S 26	25·8	25·9	26·0	26·0	25·9	25·8
3·0	ο Canis Majoris	254	00·0	00·0	00·1	00·2	00·4	00·4	S 23	52·0	52·2	52·2	52·2	52·2	52·1
1·5	ε Canis Majoris	19 255	06·8	06·8	06·9	07·1	07·2	07·3	S 29	00·2	00·4	00·4	00·4	00·4	00·3
2·9	τ Puppis	257	22·0	22·1	22·3	22·5	22·7	22·8	S 50	38·5	38·7	38·8	38·8	38·7	38·6
−1·5	α Canis Majoris	18 258	27·3	27·4	27·5	27·6	27·7	27·7	S 16	44·9	45·0	45·0	45·0	45·0	44·9
1·9	γ Geminorum	260	14·2	14·2	14·3	14·4	14·5	14·5	N 16	22·7	22·7	22·7	22·7	22·8	22·8
−0·7	α Carinæ	17 263	52·6	52·7	53·0	53·2	53·4	53·5	S 52	42·5	42·7	42·7	42·7	42·6	42·5
2·0	β Canis Majoris	264	04·1	04·1	04·2	04·4	04·5	04·5	S 17	58·1	58·2	58·2	58·2	58·2	58·1
2·6	θ Aurigæ	269	40·4	40·5	40·6	40·7	40·8	40·8	N 37	12·9	12·9	12·9	12·9	12·9	12·8
1·9	β Aurigæ	269	41·5	41·5	41·7	41·9	42·0	41·9	N 44	57·0	57·1	57·1	57·1	57·0	57·0
Var.‡	α Orionis	16 270	53·5	53·6	53·7	53·8	53·9	53·9	N 7	24·6	24·6	24·6	24·6	24·6	24·7
2·1	κ Orionis	272	47·1	47·1	47·2	47·4	47·4	47·4	S 9	39·8	39·8	39·8	39·8	39·8	39·7
1·9	ζ Orionis	274	31·0	31·1	31·2	31·3	31·4	31·3	S 1	55·9	55·9	55·9	55·9	55·9	55·8
2·6	α Columbæ	274	52·5	52·6	52·7	52·9	53·0	53·0	S 34	03·8	03·9	03·9	03·9	03·8	03·7
3·0	ξ Tauri	275	14·5	14·6	14·7	14·8	14·9	14·8	N 21	09·4	09·4	09·4	09·4	09·4	09·4
1·7	ε Orionis	15 275	39·1	39·1	39·3	39·4	39·4	39·4	S 1	11·3	11·3	11·4	11·3	11·3	11·2
2·8	ι Orionis	275	51·4	51·5	51·6	51·7	51·8	51·8	S 5	53·8	53·8	53·8	53·8	53·8	53·7
2·6	α Leporis	276	33·6	33·7	33·8	33·9	34·0	34·0	S 17	48·4	48·5	48·5	48·5	48·4	48·3
2·2	δ Orionis	276	42·1	42·1	42·2	42·4	42·4	42·4	S 0	17·0	17·0	17·0	17·0	17·0	16·9
2·8	β Leporis	277	41·3	41·4	41·5	41·7	41·7	41·7	S 20	44·6	44·6	44·7	44·6	44·6	44·4
1·7	β Tauri	14 278	03·6	03·7	03·8	03·9	04·0	03·9	N 28	37·6	37·6	37·6	37·6	37·6	37·6
1·6	γ Orionis	13 278	24·3	24·4	24·5	24·6	24·7	24·6	N 6	22·2	22·2	22·2	22·2	22·2	22·2
0·1	α Aurigæ	12 280	23·9	24·0	24·2	24·3	24·4	24·3	N 46	01·3	01·4	01·4	01·4	01·3	01·2
0·1	β Orionis	11 281	05·2	05·2	05·3	05·5	05·5	05·5	S 8	10·6	10·6	10·7	10·6	10·6	10·5
2·8	β Eridani	282	45·1	45·2	45·3	45·4	45·5	45·4	S 5	03·5	03·5	03·5	03·5	03·5	03·4
2·7	ι Aurigæ	285	22·4	22·5	22·6	22·8	22·8	22·7	N 33	12·2	12·2	12·2	12·2	12·1	12·1
0·9	α Tauri	10 290	41·2	41·3	41·4	41·5	41·6	41·5	N 16	33·3	33·3	33·3	33·3	33·3	33·3
2·9	ε Persei	300	08·9	09·0	09·1	09·2	09·2	09·1	N 40	04·7	04·7	04·7	04·6	04·6	04·5
3·0	γ Eridani	300	13·3	13·4	13·5	13·6	13·6	13·6	S 13	26·7	26·8	26·8	26·7	26·6	26·5
2·9	ξ Persei	301	06·2	06·3	06·4	06·5	06·5	06·4	N 31	57·2	57·2	57·2	57·1	57·1	57·1
2·9	η Tauri	9 302	47·1	47·2	47·3	47·4	47·4	47·3	N 24	10·6	10·6	10·6	10·6	10·5	10·5
1·8	α Persei	308	30·3	30·5	30·7	30·8	30·8	30·6	N 49	56·7	56·7	56·7	56·6	56·5	56·5
Var.§	β Persei	312	34·9	35·1	35·2	35·3	35·2	35·0	N 41	02·8	02·8	02·7	02·7	02·6	02·6
2·5	α Ceti	8 314	07·7	07·8	07·9	08·0	07·9	07·8	N 4	10·7	10·7	10·7	10·7	10·8	10·8
2·0	α Ursæ Minoris	314	38·0	51·1	63·3	70·7	70·3	62·3	N 89	21·9	22·0	21·9	21·8	21·7	21·5
3·2	θ Eridani	7 315	12·9	13·0	13·2	13·3	13·3	13·1	S 40	13·0	13·0	13·0	12·9	12·7	12·5
3·0	β Trianguli	327	16·3	16·5	16·6	16·6	16·5	16·3	N 35	05·9	05·8	05·8	05·7	05·7	05·7
2·0	α Arietis	6 327	53·0	53·1	53·2	53·2	53·1	52·9	N 23	34·3	34·3	34·2	34·2	34·2	34·2
2·3	γ Andromedæ	328	40·3	40·5	40·6	40·6	40·5	40·3	N 42	26·5	26·5	26·4	26·4	26·3	26·3
2·9	α Hydri	330	07·4	07·7	07·9	08·0	07·9	07·7	S 61	27·8	27·8	27·7	27·5	27·3	27·1
2·6	β Arietis	5 331	01·4	01·5	01·6	01·6	01·5	01·3	N 20	55·2	55·2	55·2	55·1	55·2	55·2
0·5	α Eridani	335	21·4	21·6	21·8	21·8	21·7	21·5	S 57	07·6	07·5	07·4	07·2	07·0	06·9
2·7	δ Cassiopeïæ	338	10·2	10·5	10·6	10·7	10·5	10·1	N 60	21·5	21·5	21·4	21·2	21·1	21·1
2·1	β Andromedæ	342	14·8	15·0	15·0	15·0	14·9	14·6	N 35	44·6	44·6	44·5	44·5	44·4	44·4
Var.	γ Cassiopeïæ	345	28·7	28·9	29·1	29·1	28·8	28·5	N 60	50·7	50·6	50·5	50·4	50·3	50·3
2·0	β Ceti	4 348	49·0	49·1	49·1	49·1	48·9	48·7	S 17	51·8	51·8	51·8	51·7	51·6	51·4
2·2	α Cassiopeïæ	3 349	33·0	33·2	33·3	33·3	33·1	32·7	N 56	40·0	39·9	39·8	39·7	39·6	39·6
2·4	α Phœnicis	2 353	08·9	09·0	09·0	09·0	08·8	08·5	S 42	11·2	11·1	11·0	10·8	10·7	10·6
2·8	β Hydri	353	16·1	16·6	16·9	16·8	16·3	15·7	S 77	07·9	07·8	07·6	07·4	07·2	07·1
2·8	γ Pegasi	356	23·9	24·0	24·0	23·9	23·8	23·5	N 15	18·7	18·6	18·6	18·6	18·6	18·7
2·3	β Cassiopeïæ	357	24·3	24·4	24·5	24·4	24·2	23·8	N 59	16·8	16·7	16·6	16·5	16·4	16·4
2·1	α Andromedæ	1 357	36·6	36·7	36·7	36·6	36·4	36·2	N 29	13·1	13·0	13·0	12·9	12·9	13·0

‡ 0·1 — 1·2 § 2·1 — 3·4 || Irregular variable; 2021 mag. 2·2

Mag.	Name and Number	SHA							Declination						
			JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
		°	'	'	'	'	'	'	°	'	'	'	'	'	'
1·6	<i>Castor</i>	245	59·1	58·9	58·7	58·5	58·2	57·9	N 31	50·2	50·2	50·2	50·1	50·1	50·1
3·3	<i>σ Puppis</i>	247	30·9	30·8	30·6	30·3	30·1	29·8	S 43	20·8	20·7	20·6	20·6	20·7	20·8
2·9	<i>Gomeisa</i>	247	54·1	53·9	53·7	53·5	53·3	53·1	N 8	14·6	14·6	14·6	14·6	14·6	14·5
2·4	<i>Aludra</i>	248	45·1	45·0	44·8	44·6	44·3	44·1	S 29	20·8	20·7	20·6	20·6	20·7	20·8
2·7	<i>π Puppis</i>	250	30·9	30·8	30·6	30·3	30·1	29·9	S 37	08·3	08·1	08·0	08·0	08·1	08·3
1·8	<i>Wezen</i>	252	40·2	40·1	39·9	39·7	39·5	39·3	S 26	25·7	25·6	25·5	25·5	25·6	25·7
3·0	<i>ο Canis Majoris</i>	253	60·4	60·2	60·0	59·8	59·6	59·4	S 23	52·0	51·8	51·8	51·8	51·9	52·0
1·5	<i>Adhara</i>	255	07·2	07·1	06·9	06·6	06·4	06·2	S 28	60·1	60·0	59·9	59·9	60·0	60·2
2·9	<i>τ Puppis</i>	257	22·8	22·6	22·4	22·1	21·8	21·6	S 50	38·4	38·3	38·2	38·2	38·2	38·4
−1·5	<i>Sirius</i>	258	27·7	27·5	27·3	27·1	26·9	26·7	S 16	44·8	44·7	44·6	44·7	44·7	44·9
1·9	<i>Alhena</i>	260	14·4	14·2	14·0	13·8	13·5	13·4	N 16	22·8	22·8	22·8	22·8	22·8	22·7
−0·7	<i>Canopus</i>	263	53·5	53·3	53·0	52·7	52·4	52·2	S 52	42·3	42·2	42·1	42·1	42·2	42·4
2·0	<i>Mirzam</i>	264	04·4	04·2	04·0	03·8	03·6	03·4	S 17	57·9	57·8	57·8	57·8	57·9	58·0
2·6	<i>Mahasim</i>	269	40·6	40·4	40·1	39·9	39·6	39·4	N 37	12·8	12·8	12·8	12·8	12·8	12·8
1·9	<i>Menkalinan</i>	269	41·8	41·5	41·2	40·9	40·6	40·4	N 44	56·9	56·9	56·9	56·9	56·9	56·9
Var.‡	<i>Betelgeuse</i>	16 270	53·7	53·5	53·3	53·1	52·9	52·7	N 7	24·7	24·8	24·8	24·8	24·8	24·7
2·1	<i>Saiph</i>	272	47·3	47·1	46·9	46·7	46·5	46·3	S 9	39·6	39·5	39·4	39·5	39·5	39·6
1·9	<i>Alnitak</i>	274	31·2	31·0	30·8	30·6	30·4	30·2	S 1	55·7	55·7	55·6	55·6	55·7	55·8
2·6	<i>Phact</i>	274	52·9	52·7	52·5	52·2	52·0	51·9	S 34	03·5	03·4	03·3	03·4	03·5	03·6
3·0	<i>Tianguan</i>	275	14·7	14·5	14·2	14·0	13·7	13·6	N 21	09·4	09·4	09·4	09·5	09·4	09·4
1·7	<i>Alnilam</i>	15 275	39·3	39·1	38·9	38·6	38·4	38·3	S 1	11·1	11·1	11·0	11·0	11·1	11·2
2·8	<i>Hatysa</i>	275	51·6	51·4	51·2	51·0	50·8	50·7	S 5	53·6	53·5	53·5	53·5	53·5	53·6
2·6	<i>Arneb</i>	276	33·9	33·7	33·4	33·2	33·0	32·9	S 17	48·2	48·1	48·1	48·1	48·2	48·3
2·2	<i>Mintaka</i>	276	42·3	42·1	41·8	41·6	41·4	41·3	S 0	16·8	16·8	16·7	16·7	16·8	16·9
2·8	<i>Nihal</i>	277	41·6	41·4	41·2	40·9	40·7	40·6	S 20	44·3	44·2	44·1	44·2	44·3	44·4
1·7	<i>Elnath</i>	14 278	03·8	03·5	03·3	03·0	02·8	02·6	N 28	37·6	37·6	37·6	37·6	37·6	37·7
1·6	<i>Bellatrix</i>	13 278	24·5	24·3	24·1	23·8	23·6	23·5	N 6	22·3	22·4	22·4	22·4	22·4	22·3
0·1	<i>Capella</i>	12 280	24·1	23·8	23·5	23·2	22·9	22·7	N 46	01·2	01·2	01·2	01·2	01·3	01·3
0·1	<i>Rigel</i>	11 281	05·3	05·1	04·9	04·7	04·5	04·4	S 8	10·4	10·3	10·2	10·3	10·3	10·4
2·8	<i>Cursa</i>	282	45·3	45·1	44·8	44·6	44·4	44·3	S 5	03·3	03·2	03·2	03·2	03·2	03·3
2·7	<i>Hassaleh</i>	285	22·5	22·3	22·0	21·8	21·5	21·4	N 33	12·1	12·1	12·2	12·2	12·2	12·3
0·9	<i>Aldebaran</i>	10 290	41·3	41·1	40·8	40·6	40·4	40·3	N 16	33·4	33·4	33·5	33·5	33·5	33·5
2·9	<i>ε Persei</i>	300	08·9	08·6	08·3	08·0	07·8	07·7	N 40	04·5	04·6	04·6	04·7	04·8	04·8
3·0	<i>Zaurak</i>	300	13·4	13·1	12·9	12·7	12·6	12·5	S 13	26·4	26·3	26·3	26·3	26·4	26·4
2·9	<i>ζ Persei</i>	301	06·2	05·9	05·6	05·4	05·2	05·1	N 31	57·1	57·1	57·2	57·2	57·3	57·3
2·9	<i>Alcyone</i>	302	47·1	46·8	46·5	46·3	46·2	46·1	N 24	10·6	10·6	10·7	10·7	10·8	10·8
1·8	<i>Mirfak</i>	9 308	30·3	29·9	29·6	29·3	29·2	29·1	N 49	56·5	56·5	56·6	56·7	56·8	56·9
Var.§	<i>Algol</i>	312	34·8	34·5	34·2	34·0	33·8	33·8	N 41	02·6	02·6	02·7	02·8	02·9	03·0
2·5	<i>Menkar</i>	8 314	07·6	07·3	07·1	07·0	06·9	06·8	N 4	10·9	11·0	11·1	11·1	11·1	11·0
2·0	<i>Polaris</i>	314	48·8	33·0	18·4	07·3	01·9	04·8	N 89	21·5	21·5	21·6	21·7	21·9	22·1
3·2	<i>Acamar</i>	7 315	12·9	12·6	12·3	12·2	12·1	12·1	S 40	12·4	12·3	12·3	12·4	12·5	12·6
3·0	<i>β Trianguli</i>	327	16·0	15·7	15·5	15·3	15·3	15·3	N 35	05·7	05·8	05·9	06·0	06·1	06·2
2·0	<i>Hamal</i>	6 327	52·7	52·4	52·2	52·1	52·0	52·0	N 23	34·3	34·4	34·5	34·6	34·6	34·6
2·3	<i>Almach</i>	328	40·0	39·7	39·4	39·3	39·2	39·2	N 42	26·3	26·4	26·5	26·7	26·8	26·8
2·9	<i>α Hydri</i>	330	07·3	06·9	06·6	06·4	06·4	06·6	S 61	27·0	27·0	27·0	27·2	27·3	27·4
2·6	<i>Sheratan</i>	331	01·0	00·8	00·6	00·5	00·4	00·4	N 20	55·3	55·4	55·5	55·5	55·6	55·6
0·5	<i>Achernar</i>	5 335	21·1	20·8	20·5	20·4	20·4	20·5	S 57	06·8	06·7	06·8	06·9	07·1	07·2
2·7	<i>Ruchbah</i>	338	09·7	09·3	09·0	08·9	08·8	08·9	N 60	21·1	21·2	21·4	21·6	21·7	21·8
2·1	<i>Mirach</i>	342	14·3	14·1	13·9	13·8	13·8	13·8	N 35	44·5	44·6	44·8	44·9	45·0	45·0
Var.	<i>γ Cassiopeiæ</i>	345	28·0	27·7	27·4	27·3	27·3	27·5	N 60	50·3	50·5	50·6	50·8	50·9	51·0
2·0	<i>Diphda</i>	4 348	48·5	48·2	48·1	48·0	48·0	48·1	S 17	51·3	51·3	51·3	51·3	51·4	51·4
2·2	<i>Schedar</i>	3 349	32·3	32·0	31·8	31·7	31·8	31·9	N 56	39·7	39·8	40·0	40·1	40·3	40·4
2·4	<i>Ankaa</i>	2 353	08·2	08·0	07·8	07·8	07·8	07·9	S 42	10·5	10·5	10·5	10·6	10·7	10·8
2·8	<i>β Hydri</i>	353	14·9	14·1	13·6	13·6	13·9	14·5	S 77	07·0	07·1	07·2	07·3	07·5	07·5
2·8	<i>Algenib</i>	356	23·3	23·1	22·9	22·9	22·9	23·0	N 15	18·8	18·9	19·0	19·0	19·1	19·1
2·3	<i>Caph</i>	357	23·4	23·1	22·9	22·9	23·0	23·1	N 59	16·5	16·6	16·8	17·0	17·1	17·2
2·1	<i>Alpheratz</i>	1 357	35·9	35·7	35·6	35·5	35·6	35·6	N 29	13·1	13·2	13·3	13·4	13·5	13·5

‡ 0·1 — 1·2 § 2·1 — 3·4 || Irregular variable; 2021 mag. 2·2

POLARIS (POLE STAR) TABLES, 2023
FOR DETERMINING LATITUDE FROM SEXTANT ALTITUDE AND FOR AZIMUTH

LHA ARIES	0° — 9°	10° — 19°	20° — 29°	30° — 39°	40° — 49°	50° — 59°	60° — 69°	70° — 79°	80° — 89°	90° — 99°	100° — 109°	110° — 119°
	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀
0	0 32.1	0 27.7	0 24.3	0 22.0	0 20.8	0 20.7	0 21.9	0 24.1	0 27.4	0 31.7	0 36.8	0 42.6
1	31.6	27.4	24.1	21.8	20.7	20.8	22.0	24.4	27.8	32.2	37.4	43.2
2	31.2	27.0	23.8	21.7	20.7	20.9	22.2	24.7	28.2	32.7	38.0	43.9
3	30.7	26.6	23.5	21.5	20.6	20.9	22.4	25.0	28.6	33.2	38.5	44.5
4	30.2	26.3	23.3	21.4	20.6	21.0	22.6	25.3	29.1	33.7	39.1	45.1
5	0 29.8	0 25.9	0 23.0	0 21.2	0 20.6	0 21.1	0 22.8	0 25.7	0 29.5	0 34.2	0 39.7	0 45.7
6	29.4	25.6	22.8	21.1	20.6	21.3	23.1	26.0	29.9	34.7	40.2	46.3
7	29.0	25.2	22.6	21.0	20.6	21.4	23.3	26.3	30.4	35.2	40.8	47.0
8	28.5	24.9	22.4	20.9	20.6	21.5	23.6	26.7	30.8	35.8	41.4	47.6
9	28.1	24.6	22.2	20.8	20.7	21.7	23.8	27.1	31.3	36.3	42.0	48.3
10	0 27.7	0 24.3	0 22.0	0 20.8	0 20.7	0 21.9	0 24.1	0 27.4	0 31.7	0 36.8	0 42.6	0 48.9
Lat.	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁
0	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4
10	.5	.5	.6	.6	.6	.6	.6	.5	.5	.5	.4	.4
20	.5	.6	.6	.6	.6	.6	.6	.6	.5	.5	.5	.4
30	.5	.6	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5
40	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
45	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
50	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
55	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
60	.6	.6	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7
62	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
64	.7	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7	.8
66	.7	.7	.6	.6	.6	.6	.6	.7	.7	.7	.8	.8
68	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8
Month	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂
Jan.	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Feb.	.6	.7	.7	.7	.8	.8	.8	.8	.8	.8	.8	.8
Mar.	.5	.6	.6	.7	.7	.8	.8	.9	.9	.9	.9	0.9
Apr.	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0
May	.2	.3	.3	.4	.5	.5	.6	.7	.7	.8	.8	0.9
June	.2	.2	.3	.3	.3	.4	.4	.5	.6	.6	.7	.8
July	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6
Aug.	.4	.4	.3	.3	.3	.3	.3	.3	.3	.4	.4	.5
Sept.	.6	.5	.5	.4	.4	.4	.3	.3	.3	.3	.3	.3
Oct.	0.8	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3
Nov.	0.9	0.9	0.8	0.8	.7	.7	.6	.5	.4	.4	.3	.3
Dec.	1.1	1.0	1.0	1.0	0.9	0.8	0.8	0.7	0.6	0.5	0.4	0.4
Lat.	AZIMUTH											
0	0.4	0.3	0.2	0.1	0.0	359.9	359.8	359.7	359.6	359.5	359.5	359.4
20	0.4	0.3	0.2	0.1	0.0	359.9	359.8	359.7	359.6	359.5	359.4	359.4
40	0.5	0.4	0.3	0.2	0.0	359.9	359.7	359.6	359.5	359.4	359.3	359.2
50	0.6	0.5	0.3	0.2	0.0	359.8	359.7	359.5	359.4	359.2	359.1	359.1
55	0.7	0.6	0.4	0.2	0.0	359.8	359.6	359.4	359.3	359.1	359.0	359.0
60	0.8	0.7	0.5	0.2	0.0	359.8	359.6	359.4	359.2	359.0	358.9	358.8
65	1.0	0.8	0.5	0.3	0.0	359.7	359.5	359.2	359.0	358.8	358.7	358.6

Latitude = Apparent altitude (corrected for refraction) $-1^{\circ} + a_0 + a_1 + a_2$

The table is entered with LHA Aries to determine the column to be used; each column refers to a range of 10°. *a*₀ is taken, with mental interpolation, from the upper table with the units of LHA Aries in degrees as argument; *a*₁, *a*₂ are taken, without interpolation, from the second and third tables with arguments latitude and month respectively. *a*₀, *a*₁, *a*₂, are always positive. The final table gives the azimuth of *Polaris*.

LHA ARIES	120° – 129°	130° – 139°	140° – 149°	150° – 159°	160° – 169°	170° – 179°	180° – 189°	190° – 199°	200° – 209°	210° – 219°	220° – 229°	230° – 239°
	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀	<i>a</i> ₀
0	0 48.9	0 55.5	I 02.1	I 08.7	I 14.9	I 20.7	I 25.8	I 30.0	I 33.4	I 35.6	I 36.8	I 36.9
1	49.5	56.1	02.8	09.3	15.5	21.2	26.2	30.4	33.6	35.8	36.9	36.8
2	50.2	56.8	03.5	10.0	16.1	21.7	26.7	30.8	33.9	36.0	36.9	36.7
3	50.8	57.5	04.1	10.6	16.7	22.3	27.1	31.1	34.2	36.1	37.0	36.7
4	51.5	58.1	04.8	11.2	17.3	22.8	27.6	31.5	34.4	36.3	37.0	36.6
5	0 52.2	0 58.8	I 05.4	I 11.8	I 17.9	I 23.3	I 28.0	I 31.8	I 34.6	I 36.4	I 37.0	I 36.5
6	52.8	0 59.5	06.1	12.5	18.4	23.8	28.4	32.1	34.9	36.5	37.0	36.4
7	53.5	I 00.1	06.7	13.1	19.0	24.3	28.8	32.5	35.1	36.6	37.0	36.2
8	54.1	00.8	07.4	13.7	19.6	24.8	29.2	32.8	35.3	36.7	37.0	36.1
9	54.8	01.5	08.0	14.3	20.1	25.3	29.6	33.1	35.5	36.8	36.9	35.9
10	0 55.5	I 02.1	I 08.7	I 14.9	I 20.7	I 25.8	I 30.0	I 33.4	I 35.6	I 36.8	I 36.9	I 35.8
Lat.	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁	<i>a</i> ₁
0	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6
10	.4	.4	.4	.4	.4	.5	.5	.5	.6	.6	.6	.6
20	.4	.4	.4	.4	.5	.5	.5	.6	.6	.6	.6	.6
30	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6
40	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
45	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
50	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
55	.6	.7	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
60	.7	.7	.7	.7	.7	.7	.6	.6	.6	.6	.6	.6
62	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
64	.8	.8	.8	.8	.7	.7	.7	.6	.6	.6	.6	.6
66	.8	.8	.8	.8	.8	.7	.7	.7	.6	.6	.6	.6
68	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6
Month	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂	<i>a</i> ₂
Jan.	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Feb.	.8	.8	.7	.7	.6	.6	.6	.5	.5	.5	.4	.4
Mar.	0.9	0.9	0.9	0.8	.8	.7	.7	.6	.6	.5	.5	.4
Apr.	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.5
May	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	.9	.8	.7	.7
June	.8	0.9	0.9	1.0	1.0	1.0	1.0	1.0	.9	.9	.9	.8
July	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Aug.	.5	.6	.6	.7	.7	.8	.8	.8	.9	.9	.9	.9
Sept.	.4	.4	.4	.5	.5	.6	.6	.7	.7	.8	.8	.8
Oct.	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7
Nov.	.2	.2	.2	.2	.2	.2	.3	.3	.4	.4	.5	.5
Dec.	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4
Lat.	AZIMUTH											
0	359.4	359.4	359.4	359.4	359.4	359.5	359.6	359.7	359.8	359.9	0.0	0.1
20	359.3	359.3	359.3	359.4	359.4	359.5	359.6	359.7	359.8	359.9	0.0	0.1
40	359.2	359.2	359.2	359.2	359.3	359.4	359.5	359.6	359.7	359.9	0.0	0.1
50	359.0	359.0	359.0	359.1	359.1	359.2	359.4	359.5	359.7	359.8	0.0	0.2
55	358.9	358.9	358.9	359.0	359.0	359.2	359.3	359.4	359.6	359.8	0.0	0.2
60	358.7	358.7	358.7	358.8	358.9	359.0	359.2	359.4	359.6	359.8	0.0	0.2
65	358.5	358.5	358.5	358.6	358.7	358.9	359.0	359.3	359.5	359.7	0.0	0.2

ILLUSTRATION

On 2023 April 21 at
23^h 18^m 56^s UT in longitude
W 37° 14', the apparent altitude
(corrected for refraction), *H*₀, of
Polaris was 49° 31.6

From the daily pages:

GHA Aries (23^h)
Increment (18^m 56^s)
Longitude (west)

LHA Aries

*H*₀
*a*₀ (argument 162° 16')
*a*₁ (Lat 50° approx.)
*a*₂ (April)

49 31.6
I 16.3
0.6
0.9

Sum – 1° = Lat =

49 49.4

POLARIS (POLE STAR) TABLES, 2023

FOR DETERMINING LATITUDE FROM SEXTANT ALTITUDE AND FOR AZIMUTH

LHA ARIES	240° – 249°	250° – 259°	260° – 269°	270° – 279°	280° – 289°	290° – 299°	300° – 309°	310° – 319°	320° – 329°	330° – 339°	340° – 349°	350° – 359°
	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0	a_0
0	1 35.8	1 33.6	1 30.3	1 26.1	1 21.1	1 15.4	1 09.2	1 02.6	0 56.0	0 49.4	0 43.1	0 37.3
1	35.6	33.3	29.9	25.6	20.5	14.8	08.5	02.0	55.3	48.8	42.5	36.7
2	35.4	33.0	29.6	25.2	20.0	14.2	07.9	01.3	54.6	48.1	41.9	36.2
3	35.2	32.7	29.2	24.7	19.4	13.6	07.2	00.6	54.0	47.5	41.3	35.6
4	35.0	32.4	28.7	24.2	18.9	12.9	06.6	1 00.0	53.3	46.8	40.7	35.1
5	1 34.8	1 32.1	1 28.3	1 23.7	1 18.3	1 12.3	1 05.9	0 59.3	0 52.7	0 46.2	0 40.1	0 34.6
6	34.6	31.7	27.9	23.2	17.7	11.7	05.3	58.6	52.0	45.6	39.5	34.1
7	34.3	31.4	27.5	22.7	17.2	11.1	04.6	58.0	51.4	44.9	39.0	33.6
8	34.1	31.0	27.0	22.2	16.6	10.4	04.0	57.3	50.7	44.3	38.4	33.1
9	33.8	30.7	26.6	21.6	16.0	09.8	03.3	56.6	50.0	43.7	37.8	32.6
10	1 33.6	1 30.3	1 26.1	1 21.1	1 15.4	1 09.2	1 02.6	0 56.0	0 49.4	0 43.1	0 37.3	0 32.1
Lat.	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1
0	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4
10	.6	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.5
20	.6	.6	.5	.5	.5	.4	.4	.4	.4	.4	.5	.5
30	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
40	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
45	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
50	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
55	.6	.6	.6	.6	.6	.6	.6	.7	.6	.6	.6	.6
60	.6	.6	.6	.7	.7	.7	.7	.7	.7	.7	.7	.7
62	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
64	.6	.6	.7	.7	.7	.8	.8	.8	.8	.8	.7	.7
66	.6	.7	.7	.7	.8	.8	.8	.8	.8	.8	.8	.7
68	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.8	0.8
Month	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2	a_2
Jan.	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7
Feb.	.4	.4	.4	.4	.4	.4	.4	.4	.5	.5	.6	.6
Mar.	.4	.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.5
Apr.	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3
May	.6	.5	.5	.4	.4	.3	.3	.2	.2	.2	.2	.2
June	.8	.7	.6	.6	.5	.4	.4	.3	.3	.2	.2	.2
July	0.9	0.8	0.8	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3
Aug.	.9	.9	.9	.8	.8	.7	.7	.6	.6	.5	.5	.4
Sept.	.9	.9	.9	.9	.9	.9	.8	.8	.8	.7	.7	.6
Oct.	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8
Nov.	.6	.7	.8	.8	.9	.9	1.0	1.0	1.0	1.0	1.0	1.0
Dec.	0.4	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.1
Lat.	AZIMUTH											
0	0.2	0.3	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5
20	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.5
40	0.3	0.4	0.5	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.7	0.6
50	0.3	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.0	0.9	0.9	0.8
55	0.4	0.5	0.7	0.8	0.9	1.0	1.1	1.1	1.1	1.1	1.0	0.9
60	0.4	0.6	0.8	1.0	1.1	1.2	1.2	1.3	1.3	1.2	1.1	1.0
65	0.5	0.7	0.9	1.1	1.3	1.4	1.5	1.5	1.5	1.4	1.3	1.2

$$\text{Latitude} = \text{Apparent altitude (corrected for refraction)} - 1^\circ + a_0 + a_1 + a_2$$

The table is entered with LHA Aries to determine the column to be used; each column refers to a range of 10° . a_0 is taken, with mental interpolation, from the upper table with the units of LHA Aries in degrees as argument; a_1 , a_2 are taken, without interpolation, from the second and third tables with arguments latitude and month respectively. a_0 , a_1 , a_2 , are always positive. The final table gives the azimuth of *Polaris*.

SIGHT REDUCTION PROCEDURES

METHODS AND FORMULAE FOR DIRECT COMPUTATION

1. *Introduction.* In this section, formulae and methods are provided for *calculating* position at sea from observed altitudes taken with a marine sextant using a computer or programmable calculator.

The method uses analogous concepts and similar terminology as that used in *manual* methods of astro-navigation, where position is found by plotting position lines from their intercept and azimuth on a marine chart.

The algorithms are presented in standard algebra suitable for translating into the programming language of the user's computer. The basic ephemeris data may be taken directly from the main tabular pages of a current version of *The Nautical Almanac*. Formulae are given for calculating altitude and azimuth from the *GHA* and *Dec* of a body, and the estimated position of the observer. Formulae are also given for reducing sextant observations to observed altitudes by applying the corrections for dip, refraction, parallax and semi-diameter.

The intercept and azimuth obtained from each observation determine a position line, and the observer should lie on or close to each position line. The method of least squares is used to calculate the fix by finding the position where the sum of the squares of the distances from the position lines is a minimum. The use of least squares has other advantages. For example, it is possible to improve the estimated position at the time of fix by repeating the calculation. It is also possible to include more observations in the solution and to reject doubtful ones.

2. *Notation.*

GHA = Greenwich hour angle. The range of *GHA* is from 0° to 360° starting at 0° on the Greenwich meridian increasing to the west, back to 360° on the Greenwich meridian.

SHA = sidereal hour angle. The range is 0° to 360° .

Dec = declination. The sign convention for declination is north is positive, south is negative. The range is from -90° at the south celestial pole to $+90^\circ$ at the north celestial pole.

Long = longitude. The sign convention is east is positive, west is negative. The range is -180° to $+180^\circ$.

Lat = latitude. The sign convention is north is positive, south is negative. The range is from -90° to $+90^\circ$.

LHA = *GHA* + *Long* = local hour angle. The *LHA* increases to the west from 0° on the local meridian to 360° .

H_C = calculated altitude. Above the horizon is positive, below the horizon is negative. The range is from -90° in the nadir to $+90^\circ$ in the zenith.

H_S = sextant altitude.

H = apparent altitude = sextant altitude corrected for instrumental error and dip.

H_O = observed altitude = apparent altitude corrected for refraction and, in appropriate cases, corrected for parallax and semi-diameter.

Z = *Z_N* = true azimuth. *Z* is measured from true north through east, south, west and back to north. The range is from 0° to 360° .

I = sextant index error.

D = dip of horizon.

R = atmospheric refraction.

HP = horizontal parallax of the Sun, Moon, Venus or Mars.
 PA = parallax in altitude of the Sun, Moon, Venus or Mars.
 SD = semi-diameter of the Sun or Moon.
 p = intercept = $H_O - H_C$. Towards is positive, away is negative.
 T = course or track, measured as for azimuth from the north.
 V = speed in knots.

3. *Entering Basic Data.* When quantities such as GHA are entered, which in *The Nautical Almanac* are given in degrees and minutes, convert them to degrees and decimals of a degree by dividing the minutes by 60 and adding to the degrees; for example, if $GHA = 123^\circ 45'6$, enter the two numbers 123 and 45.6 into the memory and set $GHA = 123 + 45.6/60 = 123.7600$. Although four decimal places of a degree are shown in the examples, it is assumed that full precision is maintained in the calculations.

When using a computer or programmable calculator, write a subroutine to convert degrees and minutes to degrees and decimals. Scientific calculators usually have a special key for this purpose. For quantities like Dec which require a minus sign for southern declination, change the sign from plus to minus after the value has been converted to degrees and decimals, e.g. $Dec = S 0^\circ 12'3 = S 0.2050 = -0.2050$. Other quantities which require conversion are semi-diameter, horizontal parallax, longitude and latitude.

4. *Interpolation of GHA and Dec* The GHA and Dec of the Sun, Moon and planets are interpolated to the time of observation by direct calculation as follows: If the universal time is $a^h b^m c^s$, form the interpolation factor $x = b/60 + c/3600$. Enter the tabular value GHA_0 for the preceding hour (a) and the tabular value GHA_1 for the following hour ($a + 1$) then the interpolated value GHA is given by

$$GHA = GHA_0 + x(GHA_1 - GHA_0)$$

If the GHA passes through 360° between tabular values, add 360° to GHA_1 before interpolation. If the interpolated value exceeds 360° , subtract 360° from GHA .

Similarly for declination, enter the tabular value Dec_0 for the preceding hour (a) and the tabular value Dec_1 for the following hour ($a + 1$), then the interpolated value Dec is given by

$$Dec = Dec_0 + x(Dec_1 - Dec_0)$$

5. *Example.* (a) Find the GHA and Dec of the Sun on 2023 January 27 at $10^h 47^m 13^s$ UT.

The interpolation factor $x = 47/60 + 13/3600 = 0.7869$

page 27 $10^h GHA_0 = 326^\circ 50'3 = 326.8383$

$11^h GHA_1 = 341^\circ 50'2 = 341.8367$

$10.7869 GHA = 326.8383 + 0.7869(341.8367 - 326.8383) = 338.6412$

$10^h Dec_0 = S 18^\circ 28'5 = -18.4750$

$11^h Dec_1 = S 18^\circ 27'8 = -18.4633$

$10.7869 Dec = -18.4750 + 0.7869(-18.4633 + 18.4750) = -18.4658$

GHA Aries is interpolated in the same way as GHA of a body. For a star the SHA and Dec are taken from the tabular page and do not require interpolation, then

$$GHA = GHA \text{ Aries} + SHA$$

where GHA Aries is interpolated to the time of observation.

(b) Find the *GHA* and *Dec* of *Vega* on 2023 August 13 at 2^h 47^m 13^s UT.

The interpolation factor $x = 0^h7869$ as in the previous example

page 158 2^h *GHA* Aries₀ = 351° 15'4 = 351°2567

3^h *GHA* Aries₁ = 6° 17'9 = 366°2983 (360° added)

2^h7869 *GHA* Aries = 351·2567 + 0·7869(366·2983 – 351·2567) = 363°0936

SHA = 80° 33'7 = 80°5617

GHA = *GHA* Aries + *SHA* = 83°6553 (multiple of 360° removed)

Dec = N 38° 48'5 = +38°8083

6. *The calculated altitude and azimuth.* The calculated altitude H_C and true azimuth Z are determined from the *GHA* and *Dec* interpolated to the time of observation and from the *Long* and *Lat* estimated at the time of observation as follows:

Step 1. Calculate the local hour angle

$$LHA = GHA + Long$$

Add or subtract multiples of 360° to set *LHA* in the range 0° to 360°.

Step 2. Calculate S , C and the altitude H_C from

$$S = \sin Dec$$

$$C = \cos Dec \cos LHA$$

$$H_C = \sin^{-1}(S \sin Lat + C \cos Lat)$$

where $\sin^{-1}$ is the inverse function of sine.

Step 3. Calculate X and A from

$$X = (S \cos Lat - C \sin Lat) / \cos H_C$$

$$\text{If } X > +1 \text{ set } X = +1$$

$$\text{If } X < -1 \text{ set } X = -1$$

$$A = \cos^{-1} X$$

where $\cos^{-1}$ is the inverse function of cosine.

Step 4. Determine the azimuth Z

$$\text{If } LHA > 180^\circ \text{ then } Z = A$$

$$\text{Otherwise } Z = 360^\circ - A$$

7. *Example.* Find the calculated altitude H_C and azimuth Z when

$$GHA = 53^\circ \quad Dec = S 15^\circ \quad Lat = N 32^\circ \quad Long = W 16^\circ$$

For the calculation

$$GHA = 53^\circ0000 \quad Dec = -15^\circ0000 \quad Lat = +32^\circ0000 \quad Long = -16^\circ0000$$

Step 1. $LHA = 53\cdot0000 - 16\cdot0000 = 37\cdot0000$

Step 2. $S = -0\cdot2588$

$$C = +0\cdot9659 \times 0\cdot7986 = 0\cdot7714$$

$$\sin H_C = -0\cdot2588 \times 0\cdot5299 + 0\cdot7714 \times 0\cdot8480 = 0\cdot5171$$

$$H_C = 31^\circ1346$$

$$\text{Step 3.} \quad X = (-0.2588 \times 0.8480 - 0.7714 \times 0.5299)/0.8560 = -0.7340$$

$$A = 137.2239$$

$$\text{Step 4.} \quad \text{Since } LHA \leq 180^\circ \text{ then } Z = 360^\circ - A = 222.7761$$

8. *Reduction from sextant altitude to observed altitude.* The sextant altitude H_s is corrected for both dip and index error to produce the apparent altitude. The observed altitude H_o is calculated by applying a correction for refraction. For the Sun, Moon, Venus and Mars a correction for parallax is also applied to H , and for the Sun and Moon a further correction for semi-diameter is required. The corrections are calculated as follows:

Step 1. Calculate dip

$$D = 0.0293\sqrt{h}$$

where h is the height of eye above the horizon in metres.

Step 2. Calculate apparent altitude

$$H = H_s + I - D$$

where I is the sextant index error.

Step 3. Calculate refraction (R) at a standard temperature of 10° Celsius (C) and pressure of 1010 millibars (mb)

$$R_0 = 0.0167 / \tan(H + 7.32/(H + 4.32))$$

If the temperature $T^\circ C$ and pressure P mb are known calculate the refraction from

$$R = fR_0 \quad \text{where} \quad f = 0.28P/(T + 273)$$

$$\text{otherwise set} \quad R = R_0$$

Step 4. Calculate the parallax in altitude (PA) from the horizontal parallax (HP) and the apparent altitude (H) for the Sun, Moon, Venus and Mars as follows:

$$PA = HP \cos H$$

For the Sun $HP = 0.0024$. This correction is very small and could be ignored.

For the Moon HP is taken for the nearest hour from the main tabular page and converted to degrees.

For Venus and Mars the HP is taken from the critical table at the bottom of page 259 and converted to degrees.

For the navigational stars and the remaining planets, Jupiter and Saturn, set $PA = 0$.

If an error of 0.2 is significant the expression for the parallax in altitude for the Moon should include a small correction OB for the oblateness of the Earth as follows:

$$PA = HP \cos H + OB$$

$$\text{where } OB = -0.0032 \sin^2 \text{Lat} \cos H + 0.0032 \sin(2\text{Lat}) \cos Z \sin H$$

At mid-latitudes and for altitudes of the Moon below 60° a simple approximation to OB is

$$OB = -0.0017 \cos H$$

Step 5. Calculate the semi-diameter for the Sun and Moon as follows:

Sun: SD is taken from the main tabular page and converted to degrees.

Moon: $SD = 0.2724HP$ where HP is taken for the nearest hour from the main tabular page and converted to degrees.

Step 6. Calculate the observed altitude

$$H_O = H - R + PA \pm SD$$

where the plus sign is used if the lower limb of the Sun or Moon was observed and the minus sign if the upper limb was observed.

9. *Example.* The following example illustrates how to use a calculator to reduce the sextant altitude (H_S) to observed altitude (H_O); the sextant altitudes given are assumed to be taken on 2023 August 9 with a marine sextant, zero index error, at height 5.4 m, temperature -3°C and pressure 982 mb, the Moon sights are assumed to be taken at 10^h UT.

Body limb	Sun lower	Sun upper	Moon lower	Moon upper	Venus —	Polaris —
Sextant altitude: H_S	21.3283	3.3367	33.4600	26.1117	4.5433	49.6083
Step 1. Dip: $D = 0.0293\sqrt{h}$	0.0681	0.0681	0.0681	0.0681	0.0681	0.0681
Step 2. Apparent altitude: $H = H_S + I - D$	21.2602	3.2686	33.3919	26.0436	4.4752	49.5402
Step 3. Refraction: R_0	0.0423	0.2256	0.0251	0.0338	0.1798	0.0142
f	1.0184	1.0184	1.0184	1.0184	1.0184	1.0184
$R = fR_0$	0.0431	0.2298	0.0256	0.0344	0.1831	0.0144
Step 4. Parallax: HP	0.0024	0.0024	(56.5) 0.9417	(56.5) 0.9417	(0.5) 0.0083	—
Parallax in altitude: $PA = HP \cos H$	0.0022	0.0024	0.7862	0.8460	0.0083	—
Step 5. Semi-diameter: Sun : $SD = 15.8/60$	0.2633	0.2633	—	—	—	—
Moon : $SD = 0.2724HP$	—	—	0.2565	0.2565	—	—
Step 6. Observed altitude: $H_O = H - R + PA \pm SD$	21.4827	2.7779	34.4090	26.5987	4.3005	49.5258

Note that for the Moon the correction for the oblateness of the Earth of about $-0.0017 \cos H$, which equals -0.0014 for the lower limb and -0.0015 for the upper limb, has been ignored in the above calculation.

10. *Position from intercept and azimuth using a chart.* An estimate is made of the position at the adopted time of fix. The position at the time of observation is then calculated by dead reckoning from the time of fix. For example, if the course (track) T and the speed V (in knots) of the observer are constant, then *Long* and *Lat* at the time of observation are calculated from

$$Long = L_F + t(V/60) \sin T / \cos B_F$$

$$Lat = B_F + t(V/60) \cos T$$

where L_F and B_F are the estimated longitude and latitude at the time of fix and t is the time interval in hours from the time of fix to the time of observation, t is positive if the time of observation is after the time of fix and negative if it was before.

The position line of an observation is plotted on a chart using the intercept

$$p = H_O - H_C$$

and azimuth Z with origin at the calculated position ($Long$, Lat) at the time of observation, where H_C and Z are calculated using the method in section 6, page 279. Starting from this calculated position a line is drawn on the chart along the direction of the azimuth to the body. Convert p to nautical miles by multiplying by 60. The position line is drawn at right angles to the azimuth line, distance p from ($Long$, Lat) towards the body if p is positive and distance p away from the body if p is negative. Provided there are no gross errors, the navigator should be somewhere on or near the position line at the time of observation. Two or more position lines are required to determine a fix.

11. *Position from intercept and azimuth by calculation.* The position of the fix may be calculated from two or more sextant observations as follows.

If p_1 , Z_1 , are the intercept and azimuth of the first observation, p_2 , Z_2 , of the second observation and so on, form the summations

$$A = \cos^2 Z_1 + \cos^2 Z_2 + \dots$$

$$B = \cos Z_1 \sin Z_1 + \cos Z_2 \sin Z_2 + \dots$$

$$C = \sin^2 Z_1 + \sin^2 Z_2 + \dots$$

$$D = p_1 \cos Z_1 + p_2 \cos Z_2 + \dots$$

$$E = p_1 \sin Z_1 + p_2 \sin Z_2 + \dots$$

where the number of terms in each summation is equal to the number of observations.

With $G = AC - B^2$, an improved estimate of the position at the time of fix (L_I , B_I) is given by

$$L_I = L_F + (AE - BD)/(G \cos B_F), \quad B_I = B_F + (CD - BE)/G$$

Calculate the distance d between the initial estimated position (L_F , B_F) at the time of fix and the improved estimated position (L_I , B_I) in nautical miles from

$$d = 60 \sqrt{((L_I - L_F)^2 \cos^2 B_F + (B_I - B_F)^2)}$$

If d exceeds about 20 nautical miles set $L_F = L_I$, $B_F = B_I$ and repeat the calculation until d , the distance between the position at the previous estimate and the improved estimate, is less than about 20 nautical miles.

12. *Example of direct computation.* Using the method described above, calculate the position of a ship on 2023 July 4 at 21^h 00^m 00^s UT from the marine sextant observations of the three stars *Regulus* (No. 26) at 20^h 39^m 23^s UT, *Antares* (No. 42) at 20^h 45^m 47^s UT and *Kochab* (No. 40) at 21^h 10^m 34^s UT, where the observed altitudes of the three stars corrected for the effects of refraction, dip and instrumental error, are 27°2881, 25°8314 and 47°5651 respectively. The ship was travelling at a constant speed of 20 knots on a course of 325° during the period of observation, and the position of the ship at the time of fix 21^h 00^m 00^s UT is only known to the nearest whole degree W 15°, N 32°.

Intermediate values for the first iteration are shown in the table. *GHA* Aries was interpolated from the nearest tabular values on page 132. For the first iteration set $L_F = -15^\circ 0000$, $B_F = +32^\circ 0000$ at the time of fix at $21^h 00^m 00^s$ UT.

Body No.	First Iteration		
	<i>Regulus</i> 26	<i>Antares</i> 42	<i>Kochab</i> 40
time of observation	$20^h 39^m 23^s$	$20^h 45^m 47^s$	$21^h 10^m 34^s$
H_O	27.2881	25.8314	47.5651
interpolation factor	0.6564	0.7631	0.1761
<i>GHA</i> Aries	232.4432	234.0476	240.2604
<i>SHA</i> (page 132)	207.6000	112.2850	137.3183
<i>GHA</i>	80.0432	346.3326	17.5787
<i>Dec</i> (page 132)	+11.8550	-26.4850	+74.0633
t	-0.3436	-0.2369	+0.1761
<i>Long</i>	-14.9225	-14.9466	-15.0397
<i>Lat</i>	+31.9062	+31.9353	+32.0481
Z	267.2132	151.6401	358.9591
H_C	27.2650	25.5256	47.9652
p	+0.0231	+0.3058	-0.4001

$$A = 1.7764 \quad B = -0.3876 \quad C = 1.2236 \quad D = -0.6703 \quad E = 0.1295 \quad G = 2.0234$$

$$(AE - BD)/(G \cos B_F) = -0.0174, \quad (CD - BE)/G = -0.3805$$

An improved estimate of the position at the time of fix is

$$L_I = L_F - 0.0174 = -15.0174 \quad \text{and} \quad B_I = B_F - 0.3805 = +31.6195$$

Since the distance between the previous estimated position and the improved estimate is $d = 22.8$ nautical miles, set $L_F = -15.0174$, and $B_F = +31.6195$ and repeat the calculation. The table shows the intermediate values of the calculation for the second iteration. In each iteration the quantities H_O , *GHA*, *Dec* and t do not change.

Body No.	Second Iteration		
	<i>Regulus</i> 26	<i>Antares</i> 42	<i>Kochab</i> 40
<i>Long</i>	-14.9402	-14.9642	-15.0569
<i>Lat</i>	+31.5256	+31.5548	+31.6676
Z	267.3996	151.5374	358.9737
H_C	27.2980	25.8531	47.5850
p	-0.0098	-0.0218	-0.0199

$$A = 1.7746 \quad B = -0.3916 \quad C = 1.2254 \quad D = -0.0003 \quad E = -0.0002 \quad G = 2.0213$$

$$(AE - BD)/(G \cos B_F) = -0.0003, \quad (CD - BE)/G = -0.0002$$

An improved estimate of the position at the time of fix is

$$L_I = L_F - 0.0003 = -15.0177 \quad \text{and} \quad B_I = B_F - 0.0002 = +31.6192$$

The distance between the previous estimated position and the improved estimated position, $d = 0.02$ nautical miles, is so small that a third iteration would produce a negligible improvement to the estimate of the position.

USE OF CONCISE SIGHT REDUCTION TABLES

1. *Introduction.* The concise sight reduction tables given on pages 286 to 317 are intended for use when neither more extensive tables nor electronic computing aids are available. These "NAO sight reduction tables" provide for the reduction of the local hour angle and declination of a celestial object to azimuth and altitude, referred to an assumed position on the Earth, for use in the intercept method of celestial navigation which is now standard practice.

2. *Form of tables.* Entries in the reduction table are at a fixed interval of one degree for all latitudes and hour angles. A compact arrangement results from division of the navigational triangle into two right spherical triangles, so that the table has to be entered twice. Assumed latitude and local hour angle are the arguments for the first entry. The reduction table responds with the intermediate arguments A , B , and Z_1 , where A is used as one of the arguments for the second entry to the table, B has to be incremented by the declination to produce the quantity F , and Z_1 is a component of the azimuth angle. The reduction table is then reentered with A and F and yields H , P , and Z_2 where H is the altitude, P is the complement of the parallactic angle, and Z_2 is the second component of the azimuth angle. It is usually necessary to adjust the tabular altitude for the fractional parts of the intermediate entering arguments to derive computed altitude, and an auxiliary table is provided for the purpose. Rules governing signs of the quantities which must be added or subtracted are given in the instructions and summarized on each tabular page. Azimuth angle is the sum of two components and is converted to true azimuth by familiar rules, repeated at the bottom of the tabular pages.

Tabular altitude and intermediate quantities are given to the nearest minute of arc, although errors of $2'$ in computed altitude may accrue during adjustment for the minutes parts of entering arguments. Components of azimuth angle are stated to 0.1° ; for derived true azimuth, only whole degrees are warranted. Since objects near the zenith are difficult to observe with a marine sextant, they should be avoided; altitudes greater than about 80° are not suited to reduction by this method.

In many circumstances, the accuracy provided by these tables is sufficient. However, to maintain the full accuracy (0.1) of the ephemeral data in the almanac throughout their reduction to altitude and azimuth, more extensive tables or a calculator should be used.

3. Use of Tables.

Step 1. Determine the Greenwich hour angle (GHA) and Declination (Dec) of the body from the almanac. Select an assumed latitude (Lat) of integral degrees nearest to the estimated latitude. Choose an assumed longitude nearest to the estimated longitude such that the local hour angle

$$LHA = GHA \begin{array}{l} - \text{west} \\ + \text{east} \end{array} \text{ longitude}$$

has integral degrees.

Step 2. Enter the reduction table with Lat and LHA as arguments. Record the quantities A , B and Z_1 . Apply the rules for the sign of B and Z_1 : B is minus if $90^\circ < LHA < 270^\circ$; Z_1 has the same sign as B . Set A° = nearest whole degree of A and A' = minutes part of A . This step may be repeated for all reductions before leaving the latitude opening of the table.

Step 3. Record the declination Dec . Apply the rules for the sign of Dec : Dec is minus if the name of Dec (i.e. N or S) is contrary to latitude. Add B and Dec algebraically to produce F . If F is negative, the object is below the horizon (in sight reduction, this can occur when the objects are close to the horizon). Regard F as positive until step 7. Set F° = nearest whole degree of F and F' = minutes part of F .

- Step 4.* Enter the reduction table a second time with A° and F° as arguments and record H , P , and Z_2 . Set $P^\circ =$ nearest whole degree of P and $Z_2^\circ =$ nearest whole degree of Z_2 .
- Step 5.* Enter the auxiliary table with F' and P° as arguments to obtain $corr_1$ to H for F' . Apply the rule for the sign of $corr_1$: $corr_1$ is minus if $F < 90^\circ$ and $F' > 29'$ or if $F > 90^\circ$ and $F' < 30'$, otherwise $corr_1$ is plus.
- Step 6.* Enter the auxiliary table with A' and Z_2° as arguments to obtain $corr_2$ to H for A' . Apply the rule for the sign of $corr_2$: $corr_2$ is minus if $A' < 30'$, otherwise $corr_2$ is plus.
- Step 7.* Calculate the computed altitude H_C as the sum of H , $corr_1$ and $corr_2$. Apply the rule for the sign of H_C : H_C is minus if F is negative.
- Step 8.* Apply the rule for the sign of Z_2 : Z_2 is minus if $F > 90^\circ$. If F is negative, replace Z_2 by $180^\circ - Z_2$. Set the azimuth angle Z equal to the algebraic sum of Z_1 and Z_2 and ignore the resulting sign. Obtain the true azimuth Z_n from the rules

$$\begin{array}{ll} \text{For N latitude, if } LHA > 180^\circ & Z_n = Z \\ \text{if } LHA < 180^\circ & Z_n = 360^\circ - Z \\ \text{For S latitude, if } LHA > 180^\circ & Z_n = 180^\circ - Z \\ \text{if } LHA < 180^\circ & Z_n = 180^\circ + Z \end{array}$$

Observed altitude H_O is compared with H_C to obtain the altitude difference, which, with Z_n , is used to plot the position line.

4. *Example.* (a) Required the altitude and azimuth of *Schedar* on 2023 February 4 at UT 06^h 33^m from the estimated position N 53°, E 5°.

- | | | |
|---------------------|----------------------------|--|
| 1. Assumed latitude | $Lat = 53^\circ \text{ N}$ | |
| From the almanac | $GHA = 221^\circ 58'$ | |
| Assumed longitude | $5^\circ 02' \text{ E}$ | |
| Local hour angle | $LHA = 227$ | |
-
- | | | |
|-------------------------------|------------------|---|
| 2. Reduction table, 1st entry | | |
| $(Lat, LHA) = (53, 227)$ | $A = 26 \ 07$ | $A^\circ = 26, A' = 7$ |
| | $B = -27 \ 12$ | $Z_1 = -49.4, \quad 90^\circ < LHA < 270^\circ$ |
| 3. From the almanac | $Dec = +56 \ 40$ | $Lat \text{ and } Dec \text{ same}$ |
| Sum = $B + Dec$ | $F = +29 \ 28$ | $F^\circ = 29, F' = 28$ |
-
- | | | |
|---------------------------------|---------------|------------------------------|
| 4. Reduction table, 2nd entry | | |
| $(A^\circ, F^\circ) = (26, 29)$ | $H = 25 \ 50$ | $P^\circ = 61$ |
| | | $Z_2 = 76.3, Z_2^\circ = 76$ |
-
- | | | |
|-------------------------------|----------------|--------------------------|
| 5. Auxiliary table, 1st entry | | |
| $(F', P^\circ) = (28, 61)$ | $corr_1 = +24$ | $F < 90^\circ, F' < 29'$ |
| Sum | $26 \ 14$ | |
-
- | | | |
|-------------------------------|-----------------------|---------------|
| 6. Auxiliary table, 2nd entry | | |
| $(A', Z_2^\circ) = (7, 76)$ | $corr_2 = -2$ | $A' < 30'$ |
| 7. Sum = computed altitude | $H_C = +26^\circ 12'$ | $F > 0^\circ$ |
-
- | | | |
|-----------------------------|-------------------|-----------------------------|
| 8. Azimuth, first component | $Z_1 = -49.4$ | same sign as B |
| second component | $Z_2 = +76.3$ | $F < 90^\circ, F > 0^\circ$ |
| Sum = azimuth angle | $Z = 26.9$ | |
| True azimuth | $Z_n = 027^\circ$ | N Lat, $LHA > 180^\circ$ |

continued on page 318

Z₁: same sign as B
Z₂: (-) for F > 90°

SIGHT REDUCTION TABLE

B: (-) for 90° < LHA < 270°
Dec: (-) for Lat. contrary name

Dec. (—) for Lat. contrary name				1°			2°			3°			4°			5°			Lat. / A
LHA / F	A / H	B / P	Z ₁ / Z ₂	A / H	B / P	Z ₁ / Z ₂	A / H	B / P	Z ₁ / Z ₂	A / H	B / P	Z ₁ / Z ₂	A / H	B / P	Z ₁ / Z ₂	A / H	B / P	Z ₁ / Z ₂	LHA
0	180	0 00	90-0	0 00	89 00	90-0	0 00	88 00	90-0	0 00	87 00	90-0	0 00	86 00	90-0	0 00	85 00	90-0	180
1	179	1 00	90-0	1 00	89 00	90-0	1 00	88 00	90-0	1 00	87 00	89-9	1 00	86 00	89-9	1 00	85 00	89-9	181
2	178	2 00	90-0	2 00	89 00	90-0	2 00	88 00	89-9	2 00	87 00	89-9	2 00	86 00	89-9	2 00	85 00	89-8	182
3	177	3 00	90-0	3 00	89 00	89-9	3 00	88 00	89-9	3 00	87 00	89-8	3 00	86 00	89-8	2 59	85 00	89-7	183
4	176	4 00	90-0	4 00	89 00	89-9	4 00	88 00	89-9	4 00	87 00	89-8	3 59	85 59	89-7	3 59	84 59	89-7	184
5	175	5 00	90-0	5 00	89 00	89-9	5 00	88 00	89-8	5 00	86 59	89-7	4 59	85 59	89-7	4 59	84 59	89-6	185
6	174	6 00	90-0	6 00	89 00	89-9	6 00	87 59	89-8	6 00	86 59	89-7	5 59	85 59	89-6	5 59	84 58	89-5	186
7	173	7 00	90-0	7 00	89 00	89-9	7 00	87 59	89-8	6 59	86 59	89-6	6 59	85 58	89-5	6 58	84 58	89-4	187
8	172	8 00	90-0	8 00	88 59	89-9	8 00	87 59	89-7	7 59	86 58	89-6	7 59	85 58	89-4	7 58	84 57	89-3	188
9	171	9 00	90-0	9 00	88 59	89-8	9 00	87 59	89-8	8 59	86 58	89-5	8 59	85 57	89-4	8 58	84 56	89-2	189
10	170	10 00	90-0	10 00	88 59	89-8	10 00	87 58	89-6	9 59	86 57	89-5	9 59	85 56	89-3	9 58	84 55	89-1	190
11	169	11 00	90-0	11 00	88 59	89-8	11 00	87 58	89-6	10 59	86 57	89-4	10 58	85 56	89-2	10 57	84 54	89-0	191
12	168	12 00	90-0	12 00	88 59	89-8	12 00	87 57	89-6	11 59	86 56	89-4	11 58	85 55	89-2	11 57	84 53	88-9	192
13	167	13 00	90-0	13 00	88 58	89-8	13 00	87 57	89-5	12 59	86 55	89-3	12 58	85 54	89-1	12 57	84 52	88-8	193
14	166	14 00	90-0	14 00	88 58	89-8	13 59	87 56	89-5	13 59	86 55	89-3	13 58	85 53	89-0	13 57	84 51	88-8	194
15	165	15 00	90-0	15 00	88 58	89-7	14 59	87 56	89-5	14 59	86 54	89-2	14 58	85 52	88-9	14 56	84 49	88-7	195
16	164	16 00	90-0	16 00	88 58	89-7	15 59	87 55	89-4	15 59	86 53	89-1	15 58	85 50	88-8	15 56	84 48	88-6	196
17	163	17 00	90-0	17 00	88 57	89-7	16 59	87 55	89-4	16 59	86 52	89-1	16 57	85 49	88-8	16 56	84 46	88-5	197
18	162	18 00	90-0	18 00	88 57	89-7	17 59	87 54	89-4	17 58	86 51	89-0	17 57	85 48	88-7	17 56	84 45	88-4	198
19	161	19 00	90-0	19 00	88 57	89-7	18 59	87 53	89-3	18 58	86 50	89-0	18 57	85 46	88-6	18 55	84 43	88-3	199
20	160	20 00	90-0	20 00	88 56	89-6	19 59	87 52	89-3	19 58	86 48	88-9	19 57	85 45	88-5	19 55	84 41	88-2	200
21	159	21 00	90-0	21 00	88 56	89-6	20 59	87 51	89-2	20 58	86 47	88-8	20 57	85 43	88-5	20 55	84 39	88-1	201
22	158	22 00	90-0	22 00	88 55	89-6	21 59	87 51	89-2	21 58	86 46	88-8	21 57	85 41	88-4	21 55	84 37	88-0	202
23	157	23 00	90-0	23 00	88 55	89-6	22 59	87 50	89-2	22 58	86 44	88-7	22 56	85 39	88-3	22 54	84 34	87-9	203
24	156	24 00	90-0	24 00	88 54	89-6	23 59	87 49	89-1	23 58	86 43	88-7	23 56	85 37	88-2	23 54	84 32	87-8	204
25	155	25 00	90-0	25 00	88 54	89-5	24 59	87 48	89-1	24 58	86 41	88-6	24 56	85 35	88-1	24 54	84 29	87-7	205
26	154	26 00	90-0	26 00	88 53	89-5	25 59	87 47	89-0	25 58	86 40	88-5	25 56	85 33	88-0	25 54	84 26	87-6	206
27	153	27 00	90-0	27 00	88 53	89-5	26 59	87 45	89-0	26 58	86 38	88-5	26 56	85 31	88-0	26 53	84 24	87-5	207
28	152	28 00	90-0	28 00	88 52	89-5	27 59	87 44	88-9	27 57	86 36	88-4	27 56	85 28	87-9	27 53	84 20	87-3	208
29	151	29 00	90-0	29 00	88 51	89-4	28 59	87 43	88-9	28 57	86 34	88-3	28 55	85 26	87-8	28 53	84 17	87-2	209
30	150	30 00	90-0	30 00	88 51	89-4	29 59	87 41	88-8	29 57	86 32	88-3	29 55	85 23	87-7	29 52	84 14	87-1	210
31	149	31 00	90-0	31 00	88 50	89-4	30 59	87 40	88-8	30 57	86 30	88-2	30 55	85 20	87-6	30 52	84 10	87-0	211
32	148	32 00	90-0	32 00	88 49	89-4	31 59	87 39	88-8	31 57	86 28	88-1	31 55	85 17	87-5	31 52	84 07	86-9	212
33	147	33 00	90-0	33 00	88 48	89-4	32 59	87 37	88-7	32 57	86 25	88-1	32 55	85 14	87-4	32 52	84 03	86-8	213
34	146	34 00	90-0	34 00	88 48	89-3	33 59	87 35	88-7	33 57	86 23	88-0	33 54	85 11	87-3	33 51	83 59	86-6	214
35	145	35 00	90-0	35 00	88 47	89-3	34 59	87 34	88-6	34 57	86 20	87-9	34 54	85 07	87-2	34 51	83 54	86-5	215
36	144	36 00	90-0	36 00	88 46	89-3	35 58	87 32	88-5	35 57	86 18	87-8	35 54	85 04	87-1	35 51	83 50	86-4	216
37	143	37 00	90-0	37 00	88 45	89-2	36 58	87 30	88-5	36 56	86 15	87-7	36 54	85 00	87-0	36 50	83 45	86-2	217
38	142	38 00	90-0	38 00	88 44	89-2	37 58	87 28	88-4	37 56	86 12	87-7	37 53	84 56	86-9	37 50	83 40	86-1	218
39	141	39 00	90-0	39 00	88 43	89-2	38 58	87 26	88-4	38 56	86 09	87-6	38 53	84 52	86-8	38 49	83 35	86-0	219
40	140	40 00	90-0	40 00	88 42	89-2	39 58	87 23	88-3	39 56	86 05	87-5	39 53	84 47	86-7	39 49	83 29	85-8	220
41	139	41 00	90-0	41 00	88 41	89-1	40 58	87 21	88-3	40 56	86 02	87-4	40 53	84 42	86-5	40 49	83 23	85-7	221
42	138	42 00	90-0	42 00	88 39	89-1	41 58	87 19	88-2	41 56	85 58	87-3	41 52	84 37	86-4	41 48	83 17	85-5	222
43	137	43 00	90-0	43 00	88 38	89-1	42 58	87 16	88-1	42 56	85 54	87-2	42 52	84 32	86-3	42 48	83 11	85-4	223
44	136	44 00	90-0	44 00	88 37	89-0	43 58	87 13	88-1	43 55	85 50	87-1	43 52	84 27	86-1	43 47	83 04	85-2	224
45	135	45 00	90-0	45 00	88 35	89-0	44 58	87 10	88-0	44 55	85 46	87-0	44 52	84 21	86-0	44 47	82 57	85-0	225

Lat. / A		0°			1°			2°			3°			4°			5°			Lat. / A
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	135	45 00	90 00	90 00	44 59	88 35	89 00	44 58	87 10	88 00	44 55	85 46	87 00	44 52	84 21	86 00	44 47	82 57	85 00	225
46	134	46 00	90 00	90 00	45 59	88 34	89 00	45 58	87 07	87 59	45 55	85 41	86 59	45 51	84 15	85 59	45 46	82 49	84 80	226
47	133	47 00	90 00	90 00	46 59	88 32	88 59	46 58	87 04	87 59	46 55	85 36	86 58	46 51	84 09	85 57	46 46	82 41	84 79	227
48	132	48 00	90 00	90 00	47 59	88 30	88 59	47 58	87 01	87 58	47 55	85 31	86 57	47 51	84 02	85 56	47 46	82 33	84 55	228
49	131	49 00	90 00	90 00	48 59	88 29	88 58	48 58	86 57	87 57	48 55	85 26	86 56	48 50	83 55	85 54	48 45	82 24	84 53	229
50	130	50 00	90 00	90 00	49 59	88 27	88 58	49 58	86 53	87 56	49 54	85 20	86 54	49 50	83 47	85 52	49 44	82 15	84 51	230
51	129	51 00	90 00	90 00	50 59	88 25	88 58	50 57	86 49	87 55	50 54	85 14	86 53	50 50	83 40	85 51	50 44	82 05	83 99	231
52	128	52 00	90 00	90 00	51 59	88 23	88 57	51 57	86 45	87 54	51 54	85 08	86 52	51 49	83 31	84 99	51 43	81 55	83 96	232
53	127	53 00	90 00	90 00	52 59	88 20	88 57	52 57	86 41	87 53	52 54	85 01	86 50	52 49	83 22	84 97	52 43	81 44	83 94	233
54	126	54 00	90 00	90 00	53 59	88 18	88 56	53 57	86 36	87 52	53 54	84 54	86 59	53 49	83 13	84 95	53 42	81 32	83 92	234
55	125	55 00	90 00	90 00	54 59	88 15	88 56	54 57	86 31	87 51	54 53	84 53	86 58	54 48	83 03	84 93	54 41	81 20	82 99	235
56	124	56 00	90 00	90 00	55 59	88 13	88 55	55 57	86 26	87 50	55 53	84 39	86 56	55 48	82 52	84 91	55 41	81 06	82 96	236
57	123	57 00	90 00	90 00	56 59	88 10	88 55	56 57	86 20	86 59	56 53	84 30	86 54	56 47	82 41	83 99	56 40	80 52	82 94	237
58	122	58 00	90 00	90 00	57 59	88 07	88 54	57 57	86 14	86 58	57 52	84 21	86 52	57 47	82 29	83 96	57 39	80 38	82 91	238
59	121	59 00	90 00	90 00	58 59	88 04	88 53	58 57	86 07	86 57	58 52	84 11	86 50	58 46	82 16	83 94	58 38	80 22	81 79	239
60	120	60 00	90 00	90 00	59 59	88 00	88 53	59 56	86 00	86 55	59 52	84 01	86 48	59 46	82 02	83 91	59 37	80 05	81 74	240
61	119	61 00	90 00	90 00	60 59	87 56	88 52	60 56	85 53	86 54	60 52	83 50	86 46	60 45	81 48	82 88	60 37	79 46	81 71	241
62	118	62 00	90 00	90 00	61 59	87 52	88 51	61 56	85 45	86 52	61 51	83 38	86 44	61 44	81 32	82 85	61 36	79 27	80 79	242
63	117	63 00	90 00	90 00	62 59	87 48	88 50	62 56	85 36	86 51	62 51	83 25	86 41	62 44	81 15	82 82	62 35	79 06	80 39	243
64	116	64 00	90 00	90 00	63 59	87 43	88 50	63 56	85 27	86 59	63 52	83 11	86 48	63 43	80 56	81 99	63 33	78 43	79 99	244
65	115	65 00	90 00	90 00	64 59	87 38	88 50	64 56	85 17	86 57	64 50	82 56	86 46	64 42	80 36	81 55	64 32	78 18	79 49	245
66	114	66 00	90 00	90 00	65 59	87 33	88 50	65 55	85 06	86 55	65 49	82 39	86 43	65 41	80 15	81 19	65 31	77 52	78 99	246
67	113	67 00	90 00	90 00	66 59	87 27	88 50	66 55	84 54	86 53	66 49	82 22	86 40	66 40	79 51	80 79	66 29	77 23	78 49	247
68	112	68 00	90 00	90 00	67 59	87 20	88 50	67 55	84 40	86 51	67 48	82 02	86 42	67 39	79 26	80 29	67 28	76 51	77 89	248
69	111	69 00	90 00	90 00	68 59	87 13	87 49	68 55	84 26	86 48	68 48	81 41	86 42	68 38	78 58	79 79	68 26	76 17	77 29	249
70	110	70 00	90 00	90 00	69 59	87 05	87 43	69 54	84 10	86 45	69 47	81 17	86 41	69 37	78 27	79 52	69 25	75 39	76 59	250
71	109	71 00	90 00	90 00	70 58	86 56	87 41	70 54	83 53	86 42	70 46	80 51	86 38	70 36	77 53	79 52	70 23	74 58	75 89	251
72	108	72 00	90 00	90 00	71 58	86 46	86 59	71 54	83 33	86 39	71 46	80 22	86 38	71 35	77 15	77 99	71 20	74 12	75 00	252
73	107	73 00	90 00	90 00	72 58	86 35	86 79	72 53	83 11	86 35	72 45	79 50	86 38	72 33	76 33	77 19	72 18	73 20	74 19	253
74	106	74 00	90 00	90 00	73 58	86 23	86 55	73 53	82 47	86 31	73 44	79 14	86 39	73 31	75 46	76 39	73 15	72 23	73 19	254
75	105	75 00	90 00	90 00	74 58	86 09	86 53	74 52	82 19	86 26	74 43	78 33	86 29	74 29	74 53	75 49	74 12	71 19	72 00	255
76	104	76 00	90 00	90 00	75 58	85 52	86 00	75 52	81 47	86 20	75 41	77 47	86 20	75 27	73 53	74 49	75 09	70 07	70 79	256
77	103	77 00	90 00	90 00	76 58	85 34	85 57	76 51	81 11	86 14	76 40	76 53	86 14	76 25	72 44	73 29	76 05	68 45	69 39	257
78	102	78 00	90 00	90 00	77 58	85 12	85 53	77 50	80 28	86 07	77 38	75 51	86 07	77 22	71 25	71 89	77 01	67 11	67 79	258
79	101	79 00	90 00	90 00	78 57	84 46	84 59	78 49	79 38	85 89	78 36	74 39	85 89	78 18	69 52	70 39	77 56	65 22	65 89	259
80	100	80 00	90 00	90 00	79 57	84 16	84 53	79 48	78 38	85 89	79 34	73 12	85 89	79 14	68 04	68 49	78 50	63 16	63 79	260
81	99	81 00	90 00	90 00	80 57	83 38	83 57	80 47	77 25	85 89	80 31	71 29	85 89	80 09	65 55	66 29	79 43	60 47	61 29	261
82	98	82 00	90 00	90 00	81 56	82 51	82 59	81 45	75 55	85 89	81 28	69 22	85 89	81 04	63 19	63 69	80 34	57 51	58 29	262
83	97	83 00	90 00	90 00	82 56	81 51	81 59	82 43	74 01	85 89	82 23	66 44	85 89	81 57	60 09	60 49	81 24	54 20	54 69	263
84	96	84 00	90 00	90 00	83 55	80 31	80 66	83 41	71 32	85 89	83 18	63 22	85 89	82 48	56 13	56 49	82 12	50 04	50 39	264
85	95	85 00	90 00	90 00	84 54	78 40	78 79	84 37	68 10	85 89	83 10	58 59	85 89	83 36	51 16	51 49	82 56	44 53	45 19	265
86	94	86 00	90 00	90 00	85 53	75 57	76 00	85 32	63 24	85 89	85 00	53 05	85 89	84 21	44 56	45 19	83 36	38 34	38 79	266
87	93	87 00	90 00	90 00	86 50	71 33	71 66	86 24	56 17	85 89	85 45	44 58	85 89	85 00	36 49	36 99	84 10	30 53	31 00	267
88	92	88 00	90 00	90 00	87 46	63 26	63 49	87 10	44 59	85 89	86 24	33 40	85 89	85 32	26 31	26 69	84 37	21 45	21 89	268
89	91	89 00	90 00	90 00	88 35	45 00	45 00	87 46	26 33	85 89	86 50	18 25	85 89	85 53	14 01	14 01	84 54	11 17	11 39	269
90	90	90 00	90 00	90 00	89 00	0 00	0 00	88 00	0 00	85 89	87 00	0 00	85 89	86 00	0 00	0 00	85 00	0 00	0 00	270

N. Lat: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

Z₁: same sign as B
Z₂: (-) for F > 90°

B: (-) for 90° < LHA < 270°
Dec: (-) for Lat. contrary name

Lat. / A		6°			7°			8°			9°			10°			11°			Lat. / A
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	
0	180	0 00	90-0	0 00	83 00	90-0	0 00	82 00	90-0	0 00	81 00	90-0	0 00	80 00	90-0	0 00	79 00	90-0	180	
1	179	1 00	89-9	0 59	83 00	89-9	0 59	82 00	89-9	0 59	81 00	89-8	0 59	80 00	89-8	0 59	79 00	89-8	181	
2	178	1 59	89-8	1 59	83 00	89-8	1 59	82 00	89-8	1 59	81 00	89-7	1 59	80 00	89-7	1 58	79 00	89-6	182	
3	177	2 59	89-7	2 59	82 59	89-6	2 58	81 59	89-6	2 58	80 59	89-5	2 57	79 59	89-5	2 57	78 59	89-4	183	
4	176	3 59	89-6	3 58	82 59	89-5	3 58	81 59	89-4	3 57	80 59	89-4	3 56	79 59	89-3	3 56	78 58	89-2	184	
5	175	4 58	89-5	4 58	82 58	89-4	4 57	81 58	89-3	4 56	80 58	89-2	4 55	79 58	89-1	4 54	78 58	89-0	185	
6	174	5 58	89-4	5 57	82 58	89-3	5 56	81 57	89-2	5 56	80 57	89-1	5 55	79 57	89-0	5 53	78 56	88-9	186	
7	173	6 58	89-3	6 57	82 57	89-1	6 56	81 56	89-0	6 55	80 56	88-9	6 54	79 56	88-8	6 52	78 55	88-7	187	
8	172	7 57	89-2	7 56	82 56	89-0	7 55	81 55	88-9	7 54	80 55	88-8	7 53	79 54	88-6	7 51	78 54	88-5	188	
9	171	8 57	89-1	8 56	82 55	88-9	8 55	81 54	88-8	8 54	80 53	88-7	8 53	79 53	88-6	8 50	78 52	88-3	189	
10	170	9 57	88-9	9 55	82 54	88-8	9 54	81 53	88-6	9 53	80 52	88-4	9 51	79 51	88-2	9 49	78 50	88-1	190	
11	169	10 56	88-8	10 55	82 52	88-6	10 53	81 51	88-5	10 52	80 50	88-3	10 50	79 49	88-1	10 48	78 48	87-9	191	
12	168	11 56	88-7	11 55	82 51	88-5	11 53	81 49	88-3	11 51	80 48	88-1	11 49	79 47	87-9	11 47	78 46	87-7	192	
13	167	12 56	88-6	12 54	82 49	88-4	12 52	81 48	88-2	12 50	80 46	87-9	12 48	79 45	87-7	12 45	78 43	87-5	193	
14	166	13 55	88-5	13 54	82 47	88-3	13 52	81 46	88-0	13 49	80 44	87-8	13 47	79 42	87-5	13 44	78 40	87-3	194	
15	165	14 55	88-4	14 53	82 45	88-1	14 51	81 43	87-9	14 49	80 41	87-6	14 46	79 39	87-3	14 43	78 37	87-1	195	
16	164	15 55	88-3	15 53	82 43	88-0	15 50	81 41	87-7	15 48	80 39	87-4	15 45	79 36	87-1	15 42	78 34	86-9	196	
17	163	16 54	88-2	16 52	82 41	87-9	16 50	81 38	87-6	16 47	80 36	87-3	16 44	79 33	87-0	16 41	78 31	86-7	197	
18	162	17 54	88-1	17 52	82 39	87-7	17 49	81 36	87-4	17 46	80 33	87-1	17 43	79 30	86-8	17 39	78 27	86-5	198	
19	161	18 54	87-9	18 51	82 36	87-6	18 48	81 33	87-3	18 45	80 29	86-9	18 42	79 26	86-6	18 38	78 23	86-2	199	
20	160	19 53	87-8	19 51	82 33	87-5	19 47	81 30	87-1	19 45	80 26	86-7	19 41	79 22	86-4	19 37	78 19	86-0	200	
21	159	20 53	87-7	20 50	82 30	87-3	20 47	81 26	86-9	20 44	80 22	86-6	20 40	79 18	86-2	20 36	78 14	85-8	201	
22	158	21 52	87-6	21 50	82 27	87-2	21 46	81 23	86-8	21 43	80 18	86-4	21 39	79 14	86-0	21 35	78 10	85-6	202	
23	157	22 52	87-5	22 49	82 24	87-0	22 46	81 19	86-6	22 42	80 14	86-2	22 38	79 09	85-8	22 33	78 05	85-4	203	
24	156	23 52	87-3	23 49	82 21	86-9	23 45	81 15	86-5	23 41	80 10	86-0	23 37	79 05	85-6	23 32	77 59	85-1	204	
25	155	24 51	87-2	24 48	82 17	86-7	24 44	81 11	86-3	24 40	80 05	85-8	24 36	78 59	85-4	24 31	77 54	84-9	205	
26	154	25 51	87-1	25 48	82 13	86-6	25 44	81 07	86-1	25 39	80 00	85-6	25 35	78 54	85-2	25 29	77 48	84-7	206	
27	153	26 50	87-0	26 47	82 09	86-4	26 43	81 02	85-9	26 38	79 55	85-4	26 33	78 48	84-9	26 28	77 42	84-4	207	
28	152	27 50	86-8	27 46	82 05	86-3	27 42	80 57	85-8	27 38	79 50	85-2	27 32	78 42	84-7	27 27	77 35	84-2	208	
29	151	28 50	86-7	28 46	82 01	86-1	28 41	80 52	85-6	28 37	79 44	85-0	28 31	78 36	84-5	28 25	77 28	84-0	209	
30	150	29 49	86-5	29 45	81 56	86-0	29 41	80 47	85-4	29 36	79 38	84-8	29 30	78 29	84-3	29 24	77 21	83-7	210	
31	149	30 49	86-4	30 45	81 51	85-8	30 40	80 41	85-2	30 35	79 32	84-6	30 29	78 23	84-0	30 22	77 13	83-5	211	
32	148	31 48	86-3	31 44	81 46	85-6	31 39	80 35	85-0	31 34	79 25	84-4	31 27	78 15	83-8	31 21	77 05	83-2	212	
33	147	32 48	86-1	32 43	81 40	85-5	32 38	80 29	84-8	32 33	79 18	84-2	32 26	78 08	83-6	32 19	76 57	82-9	213	
34	146	33 47	86-0	33 43	81 35	85-3	33 37	80 23	84-6	33 32	79 11	84-0	33 25	78 00	83-3	33 18	76 48	82-7	214	
35	145	34 47	85-8	34 42	81 29	85-1	34 37	80 16	84-4	34 30	79 03	83-7	34 24	77 51	83-1	34 16	76 39	82-4	215	
36	144	35 46	85-7	35 41	81 22	84-9	35 36	80 09	84-2	35 29	78 55	83-5	35 22	77 42	82-8	35 14	76 29	82-1	216	
37	143	36 46	85-5	36 41	81 16	84-8	36 35	80 01	84-0	36 28	78 47	83-3	36 21	77 33	82-5	36 13	76 19	81-8	217	
38	142	37 45	85-3	37 40	81 09	84-6	37 34	79 53	83-8	37 27	78 38	83-0	37 19	77 23	82-3	37 11	76 09	81-5	218	
39	141	38 45	85-2	38 39	81 01	84-4	38 33	79 45	83-6	38 26	78 29	82-8	38 18	77 13	82-0	38 07	75 57	81-2	219	
40	140	39 44	85-0	39 39	80 54	84-2	39 32	79 36	83-1	39 25	78 19	82-5	39 16	77 02	81-7	39 07	75 46	80-9	220	
41	139	40 44	84-8	40 38	80 46	84-0	40 31	79 27	83-1	40 23	78 09	82-3	40 15	76 51	81-4	40 05	75 33	80-6	221	
42	138	41 43	84-6	41 37	80 37	83-7	41 30	79 17	82-9	41 22	77 58	82-0	41 13	76 39	81-1	41 04	75 21	80-3	222	
43	137	42 42	84-4	42 36	80 28	83-5	42 29	79 07	82-6	42 21	77 47	81-7	42 12	76 27	80-8	42 00	74 53	79-6	223	
44	136	43 42	84-2	43 35	80 19	83-3	43 28	78 57	82-3	43 19	77 35	81-4	43 10	76 14	80-5	43 00	74 00	79-2	224	
45	135	44 41	84-0	44 34	80 09	83-1	44 27	78 46	82-1	44 18	77 22	81-1	44 08	76 00	80-1	43 57	74 38	79-2	225	

Lat. / A		6°			7°			8°			9°			10°			11°			Lat. / A
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	135	44 41	81 33	84-0	44 34	80 09	83-1	44 27	78 46	82-1	44 18	77 22	81-1	44 08	76 00	80-1	43 57	74 38	79-2	225
46	134	45 41	81 24	83-6	45 34	79 59	82-8	45 26	78 34	81-8	45 16	77 09	80-8	45 06	75 45	79-8	44 55	74 22	78-8	226
47	133	46 40	81 14	83-6	46 33	79 48	82-6	46 24	78 24	81-5	46 15	76 56	80-5	46 04	75 30	79-5	45 53	74 05	78-4	227
48	132	47 39	81 04	83-4	47 32	79 36	82-3	47 23	78 08	80-2	47 13	76 41	80-1	47 03	75 14	79-1	46 51	73 48	78-0	228
49	131	48 38	80 54	83-1	48 31	79 24	82-0	48 22	77 55	80-9	48 12	76 26	79-8	48 01	74 57	78-7	47 48	73 30	77-6	229
50	130	49 38	80 43	82-9	49 30	79 11	81-7	49 20	77 40	80-6	49 10	76 09	79-4	48 58	74 40	78-3	48 46	73 10	77-2	230
51	129	50 37	80 31	82-6	50 29	78 58	81-4	50 19	77 25	80-2	50 08	75 52	79-1	49 56	74 21	77-9	49 43	72 50	76-7	231
52	128	51 36	80 19	82-4	51 27	78 43	81-1	51 18	77 08	79-5	51 06	75 34	78-7	50 54	74 01	77-5	50 40	72 29	76-3	232
53	127	52 35	80 06	82-1	52 26	78 28	80-8	52 16	76 51	79-9	52 04	75 15	78-3	51 52	73 40	77-0	51 37	72 06	75-8	233
54	126	53 34	79 52	81-8	53 25	78 12	80-5	53 14	76 33	79-2	53 02	74 55	77-8	52 49	73 18	76-6	52 35	71 42	75-3	234
55	125	54 33	79 37	81-5	54 24	77 55	80-1	54 13	76 14	78-8	54 00	74 34	77-4	53 47	72 55	76-1	53 31	71 17	74-8	235
56	124	55 32	79 21	81-2	55 22	77 37	79-8	55 11	75 54	78-3	54 58	74 11	76-9	54 44	72 30	75-6	54 28	70 50	74-2	236
57	123	56 31	79 05	80-9	56 21	77 18	79-4	56 09	75 32	77-9	55 56	73 47	76-5	55 41	72 04	75-0	55 25	70 22	73-6	237
58	122	57 30	78 47	80-5	57 19	76 57	79-0	57 07	75 09	77-4	56 53	72 22	75-9	56 38	71 36	74-5	56 21	69 51	73-0	238
59	121	58 29	78 28	80-1	58 18	76 35	78-5	58 05	74 44	77-0	57 51	72 54	75-4	57 35	71 06	73-9	57 17	69 19	72-4	239
60	120	59 28	78 08	79-7	59 16	76 12	78-1	59 03	74 18	76-4	58 48	72 25	74-8	58 32	70 34	73-3	58 13	68 45	71-7	240
61	119	60 26	77 46	79-3	60 14	75 47	77-6	60 01	73 50	75-9	59 45	71 54	74-2	59 28	70 01	72-6	59 09	68 09	71-0	241
62	118	61 25	77 23	78-9	61 12	75 21	77-1	60 58	73 20	75-3	60 42	71 21	73-6	60 24	69 25	71-9	60 05	67 31	70-3	242
63	117	62 23	76 58	78-4	62 10	74 52	76-5	61 56	72 48	74-7	61 39	70 46	72-9	61 20	68 46	71-2	61 00	66 49	69-5	243
64	116	63 22	76 31	77-9	63 06	74 21	76-0	62 53	72 13	74-1	62 35	70 08	72-2	62 16	68 05	70-4	61 55	66 05	68-6	244
65	115	64 20	76 02	77-4	64 06	73 48	75-4	63 50	71 36	73-4	63 32	69 27	71-5	63 12	67 21	69-6	62 40	65 18	67-7	245
66	114	65 18	75 31	76-8	65 03	73 12	74-7	64 47	70 56	72-6	64 28	68 43	70-6	64 07	66 34	68-7	63 50	64 27	66-8	246
67	113	66 16	74 57	76-2	66 01	72 33	74-0	65 43	70 13	71-8	65 23	67 56	69-8	65 02	65 43	67-8	64 38	63 33	65-8	247
68	112	67 14	74 20	75-5	66 58	71 51	73-2	66 40	69 26	71-0	66 19	67 05	68-8	65 56	64 48	66-7	65 32	62 35	64-7	248
69	111	68 12	73 39	74-8	67 55	71 05	72-4	67 36	68 35	70-1	67 14	66 09	67-8	66 50	63 48	65-7	66 25	61 31	63-6	249
70	110	69 09	72 55	74-0	68 51	70 15	71-5	68 31	67 40	69-1	68 09	65 09	66-7	67 44	62 44	64-5	67 17	60 23	62-3	250
71	109	70 07	72 06	73-1	69 48	69 20	70-5	69 27	66 39	68-0	69 03	64 03	65-6	68 37	61 34	63-2	68 09	59 10	61-0	251
72	108	71 03	71 13	72-2	70 44	68 20	69-4	70 21	65 33	66-8	69 57	62 52	64-3	69 29	60 17	61-9	69 00	57 50	59-6	252
73	107	72 00	70 14	71-1	71 39	67 13	68-3	71 16	64 20	65-5	70 50	61 35	62-9	70 21	58 54	60-4	69 50	56 23	58-0	253
74	106	72 56	69 08	70-0	72 34	65 59	67-0	72 09	62 59	64-1	71 42	60 07	61-4	71 12	57 24	58-8	70 40	54 49	56-4	254
75	105	73 52	67 54	68-7	73 29	64 37	65-5	73 03	61 30	62-6	72 34	58 32	59-7	72 02	55 44	57-1	71 28	53 06	54-5	255
76	104	74 48	66 31	67-3	74 23	63 05	64-0	73 55	59 51	60-8	73 24	56 47	57-9	72 51	53 55	55-1	72 16	51 13	52-6	256
77	103	75 42	64 57	65-6	75 16	61 22	62-2	74 46	58 00	58-9	74 14	54 51	55-9	73 39	51 55	53-1	73 02	49 10	50-4	257
78	102	76 36	63 11	63-8	76 08	59 26	60-2	75 37	55 57	56-8	75 02	52 42	53-6	74 26	49 42	50-8	73 47	46 56	48-1	258
79	101	77 29	61 09	61-7	76 59	57 14	57-9	76 26	53 38	54-4	75 49	50 18	51-2	75 11	47 16	48-2	74 30	44 28	45-5	259
80	100	78 21	58 49	59-3	77 49	54 44	55-3	77 13	51 01	51-7	76 35	47 38	48-4	75 54	44 34	45-4	75 11	41 47	42-7	260
81	99	79 12	56 06	56-6	78 37	51 52	52-4	77 59	48 04	48-7	77 18	44 39	45-4	76 35	41 35	42-4	75 49	38 50	39-7	261
82	98	80 01	52 56	53-4	79 23	48 35	49-1	78 42	44 43	45-3	77 59	41 18	41-9	77 13	38 17	39-0	76 26	35 36	36-4	262
83	97	80 47	49 13	49-6	80 07	44 47	45-2	79 23	40 56	41-4	78 37	37 35	38-1	77 49	34 39	35-3	76 59	32 05	32-8	263
84	96	81 31	44 51	45-2	80 47	40 24	40-8	80 01	36 38	37-1	79 12	33 25	33-9	78 21	30 40	31-2	77 29	28 16	28-8	264
85	95	82 12	39 40	39-9	81 24	35 22	35-7	80 34	31 48	32-2	79 43	28 49	29-2	78 50	26 18	26-7	77 56	24 09	24-6	265
86	94	82 48	33 34	33-8	81 57	29 36	29-8	81 04	26 24	26-7	80 09	23 46	24-1	79 14	21 35	21-9	78 18	19 44	20-1	266
87	93	83 18	26 28	26-6	82 23	23 05	23-3	81 28	20 25	20-6	80 31	18 17	18-5	79 34	16 32	16-8	78 36	15 04	15-4	267
88	92	83 41	18 22	18-5	82 43	15 52	16-0	81 45	13 57	14-1	79 48	12 26	12-6	79 48	11 12	11-4	78 49	10 11	10-4	268
89	91	83 55	9 26	9-5	82 56	8 05	8-2	81 56	7 05	7-1	80 57	6 17	6-4	79 57	5 39	5-7	78 57	5 08	5-2	269
90	90	84 00	0 00	0-0	83 00	0 00	0-0	82 00	0 00	0-0	81 00	0 00	0-0	80 00	0 00	0-0	79 00	0 00	0-0	270

N. Lat. for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat. for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

B: (—) for 90° < LHA < 270°
Dec:(-) for Lat. contrary name
Z₁: same sign as B
Z₂: (—) for F > 90°

Lat. / A	12°			13°			14°			15°			16°			LHA				
	LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P		Z ₁ /Z ₂			
0	180	0 00	78 00	90-0	0 00	77 00	90-0	0 00	76 00	90-0	0 00	75 00	90-0	0 00	74 00	90-0	0 00	73 00	90-0	180
1	179	0 59	78 00	89-8	0 58	77 00	89-8	0 58	76 00	89-8	0 58	75 00	89-7	0 58	74 00	89-7	0 57	73 00	89-7	181
2	178	1 57	78 00	89-6	1 57	77 00	89-5	1 56	76 00	89-5	1 56	75 00	89-4	1 55	74 00	89-4	1 55	72 59	89-4	182
3	177	2 56	77 59	89-4	2 55	76 59	89-3	2 55	76 00	89-3	2 54	74 59	89-2	2 53	73 59	89-2	2 52	72 59	89-1	183
4	176	3 55	77 58	89-2	3 54	76 58	89-1	3 53	75 58	89-0	3 52	74 58	88-9	3 51	73 58	88-8	3 49	72 58	88-8	184
5	175	4 53	77 57	89-0	4 52	76 57	88-9	4 51	75 57	88-8	4 50	74 57	88-7	4 48	73 57	88-6	4 47	72 56	88-5	185
6	174	5 52	77 56	88-7	5 51	76 56	88-6	5 49	75 56	88-5	5 48	74 55	88-4	5 46	73 55	88-3	5 44	72 55	88-2	186
7	173	6 51	77 55	88-5	6 49	76 54	88-4	6 47	75 54	88-3	6 46	74 54	88-2	6 44	73 53	88-1	6 42	72 53	87-9	187
8	172	7 49	77 53	88-3	7 48	76 53	88-2	7 46	75 52	88-1	7 44	74 52	87-9	7 41	73 51	87-8	7 39	72 51	87-6	188
9	171	8 48	77 51	88-1	8 46	76 51	88-0	8 44	75 50	87-8	8 41	74 49	87-7	8 39	73 49	87-5	8 36	72 48	87-3	189
10	170	9 47	77 49	87-9	9 44	76 48	87-7	9 42	75 48	87-6	9 39	74 47	87-4	9 37	73 46	87-2	9 34	72 45	87-0	190
11	169	10 45	77 47	87-7	10 43	76 46	87-5	10 40	75 45	87-3	10 37	74 44	87-1	10 34	73 43	86-9	10 31	72 42	86-7	191
12	168	11 44	77 44	87-5	11 41	76 43	87-3	11 38	75 42	87-1	11 35	74 41	86-9	11 32	73 40	86-6	11 28	72 39	86-4	192
13	167	12 43	77 42	87-3	12 40	76 40	87-0	12 36	75 39	86-8	12 33	74 37	86-6	12 29	73 36	86-4	12 25	72 35	86-1	193
14	166	13 41	77 39	87-0	13 38	76 37	86-8	13 35	75 35	86-5	13 31	74 34	86-3	13 27	73 32	86-1	13 23	72 31	85-8	194
15	165	14 40	77 35	86-8	14 36	76 33	86-6	14 33	75 32	86-3	14 29	74 30	86-0	14 24	73 28	85-8	14 20	72 26	85-5	195
16	164	15 38	77 32	86-6	15 35	76 30	86-3	15 31	75 28	86-0	15 26	74 25	85-8	15 22	73 23	85-5	15 17	72 21	85-2	196
17	163	16 37	77 28	86-4	16 33	76 26	86-1	16 29	75 23	85-8	16 24	74 21	85-5	16 19	73 19	85-2	16 14	72 16	84-9	197
18	162	17 36	77 24	86-1	17 31	76 21	85-8	17 27	75 19	85-5	17 22	74 16	85-2	17 17	73 13	84-9	17 11	72 11	84-6	198
19	161	18 34	77 20	85-9	18 30	76 17	85-6	18 25	75 14	85-2	18 20	74 11	84-9	18 14	73 08	84-6	18 08	72 05	84-3	199
20	160	19 33	77 15	85-7	19 28	76 12	85-3	19 23	75 08	85-0	19 17	74 05	84-6	19 12	73 02	84-3	19 05	71 59	83-9	200
21	159	20 31	77 10	85-4	20 26	76 07	85-1	20 21	75 03	84-7	20 15	73 59	84-3	20 09	72 56	84-0	20 03	71 52	83-6	201
22	158	21 30	77 05	85-2	21 24	76 01	84-8	21 19	74 57	84-4	21 13	73 53	84-0	21 06	72 49	83-6	21 00	71 45	83-3	202
23	157	22 28	77 00	85-0	22 23	75 55	84-5	22 17	74 51	84-1	22 10	73 46	83-7	22 04	72 42	83-3	21 56	71 38	82-9	203
24	156	23 27	76 54	84-7	23 21	75 49	84-3	23 15	74 44	83-9	23 08	73 39	83-4	23 01	72 34	83-0	22 53	71 30	82-6	204
25	155	24 25	76 48	84-5	24 19	75 43	84-0	24 13	74 37	83-6	24 06	73 32	83-1	23 58	72 27	82-7	23 50	71 22	82-2	205
26	154	25 23	76 42	84-2	25 17	75 36	83-7	25 10	74 30	83-3	25 03	73 24	82-8	24 55	72 18	82-3	24 47	71 13	81-9	206
27	153	26 22	76 35	84-0	26 15	75 28	83-5	26 08	74 22	83-0	26 01	73 16	82-5	25 52	72 10	82-0	25 44	71 04	81-5	207
28	152	27 20	76 28	83-7	27 13	75 21	83-2	27 06	74 14	82-7	26 58	73 07	82-2	26 50	72 00	81-7	26 41	70 54	81-2	208
29	151	28 18	76 20	83-4	28 11	75 13	82-9	28 04	74 05	82-4	27 55	72 58	81-8	27 47	71 51	81-3	27 37	70 44	80-8	209
30	150	29 17	76 13	83-2	29 09	75 04	82-6	29 01	73 56	82-0	28 53	72 48	81-5	28 44	71 41	81-0	28 34	70 33	80-4	210
31	149	30 15	76 04	82-9	30 07	74 56	82-3	30 00	73 47	81-7	29 50	72 38	81-2	29 41	71 30	80-6	29 30	70 22	80-0	211
32	148	31 13	75 56	82-6	31 05	74 46	82-0	30 57	73 37	81-4	30 47	72 28	80-8	30 37	71 19	80-2	30 27	70 11	79-6	212
33	147	32 11	75 47	82-3	32 03	74 37	81-7	31 54	73 27	81-1	31 44	72 17	80-5	31 34	71 07	79-9	31 23	69 58	79-2	213
34	146	33 10	75 37	82-0	33 01	74 26	81-4	32 52	73 16	80-7	32 42	72 05	80-1	32 31	70 55	79-5	32 20	69 45	78-8	214
35	145	34 08	75 27	81-7	33 59	74 16	81-0	33 49	73 04	80-4	33 39	71 53	79-7	33 28	70 42	79-1	33 16	69 32	78-4	215
36	144	35 06	75 17	81-4	34 56	74 04	80-7	34 46	72 52	80-0	34 36	71 40	79-4	34 24	70 29	78-7	34 12	69 18	78-0	216
37	143	36 04	75 06	81-1	35 54	73 53	80-4	35 44	72 40	79-7	35 33	71 27	79-0	35 21	70 15	78-3	35 08	69 03	77-6	217
38	142	37 02	74 54	80-8	36 52	73 40	80-0	36 41	72 27	79-3	36 29	71 13	78-6	36 17	70 00	77-8	36 04	68 48	77-1	218
39	141	38 00	74 42	80-4	37 49	73 27	79-7	37 38	72 13	78-9	37 26	70 59	78-2	37 13	69 45	77-4	37 00	68 32	76-7	219
40	140	38 57	74 30	80-1	38 47	73 14	79-3	38 35	71 58	78-5	38 23	70 43	77-7	38 10	69 29	77-0	37 56	68 15	76-2	220
41	139	39 55	74 16	79-8	39 44	72 59	78-9	39 32	71 43	78-1	39 19	70 27	77-3	39 06	69 12	76-5	38 51	67 57	75-7	221
42	138	40 53	74 02	79-4	40 41	72 45	78-5	40 29	71 27	77-7	40 16	70 10	76-9	40 02	68 54	76-1	39 47	67 38	75-3	222
43	137	41 51	73 48	79-0	41 39	72 29	78-2	41 26	71 11	77-3	41 12	69 53	76-4	40 58	68 35	75-6	40 42	67 19	74-7	223
44	136	42 48	73 32	78-6	42 36	72 12	77-7	42 23	70 53	76-9	42 09	69 34	76-0	41 54	68 16	75-1	41 38	66 58	74-2	224
45	135	43 46	73 16	78-3	43 33	71 55	77-3	43 19	70 35	76-4	43 05	69 15	75-5	42 49	67 56	74-6	42 33	66 37	73-7	225

Lat. / A		12°			13°			14°			15°			16°			17°			Lat. / A	
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	°
45	135	43 46	73 16	78.3	43 33	71 55	77.3	43 19	70 35	76.4	43 05	69 15	75.5	42 49	67 56	74.6	42 33	66 37	73.7	225	315
46	134	44 43	72 59	77.8	44 30	71 37	76.9	44 16	70 15	75.9	44 01	68 54	75.0	43 45	67 34	74.1	43 28	66 15	73.2	226	314
47	133	45 40	72 41	77.4	45 27	71 18	76.4	45 12	69 55	75.5	44 57	68 33	74.5	44 40	67 12	73.5	44 23	65 15	72.6	227	313
48	132	46 38	72 23	77.0	46 24	70 58	76.0	46 09	69 34	75.0	45 53	68 11	74.0	45 35	66 48	73.0	45 17	65 27	72.0	228	312
49	131	47 35	72 03	76.5	47 20	70 37	75.5	47 05	69 11	74.4	46 48	67 47	73.4	46 30	66 23	72.4	46 12	65 01	71.4	229	311
50	130	48 32	71 42	76.1	48 17	70 15	75.0	48 01	68 48	73.9	47 44	67 22	72.9	47 25	65 58	71.8	47 06	64 34	70.8	230	310
51	129	49 29	71 20	75.6	49 13	69 51	74.5	48 57	68 23	73.4	48 39	66 56	72.3	48 20	65 30	71.2	48 00	64 05	70.1	231	309
52	128	50 25	70 57	75.1	50 09	69 27	73.9	49 52	67 57	72.8	49 34	66 29	71.7	49 15	65 02	70.6	48 54	63 35	69.5	232	308
53	127	51 22	70 33	74.6	51 06	69 01	73.4	50 48	67 30	72.2	50 29	66 00	71.0	50 09	64 31	69.9	49 48	63 04	68.8	233	307
54	126	52 19	70 07	74.0	52 02	68 33	72.8	51 43	67 01	71.6	51 24	65 30	70.4	51 03	64 00	69.2	50 41	62 31	68.1	234	306
55	125	53 15	69 40	73.5	52 57	68 04	72.2	52 38	66 30	70.9	52 18	64 58	69.7	51 57	63 26	68.5	51 34	61 56	67.3	235	305
56	124	54 11	69 11	72.9	53 53	67 34	71.6	53 33	65 58	70.3	53 12	64 24	69.0	52 50	62 51	67.8	52 27	61 20	66.6	236	304
57	123	55 07	68 41	72.2	54 48	67 02	70.9	54 28	65 24	69.6	54 06	63 48	68.3	53 43	62 14	67.0	53 19	60 42	65.8	237	303
58	122	56 03	68 09	71.6	55 43	66 28	70.2	55 22	64 48	68.8	55 00	63 11	67.5	54 36	61 35	66.2	54 12	60 01	64.9	238	302
59	121	56 59	67 34	70.9	56 38	65 51	69.5	56 16	64 10	68.1	55 53	62 31	66.7	55 29	60 54	65.4	55 03	59 18	64.1	239	301
60	120	57 54	66 58	70.2	57 33	65 13	68.7	57 10	63 30	67.3	56 46	61 49	65.9	56 21	60 10	64.5	55 55	58 33	63.1	240	300
61	119	58 49	66 20	69.4	58 27	64 32	67.9	58 04	62 47	66.4	57 39	61 04	65.0	57 13	59 24	63.6	56 46	57 46	62.2	241	299
62	118	59 44	65 38	68.6	59 21	63 49	67.1	58 57	62 02	65.5	58 31	60 17	64.0	58 05	58 35	62.6	57 36	56 56	61.2	242	298
63	117	60 38	64 55	67.8	60 15	63 03	66.2	59 50	61 13	64.6	59 23	59 27	63.1	58 55	57 43	61.6	58 26	56 03	60.2	243	297
64	116	61 32	64 08	66.9	61 08	62 14	65.2	60 42	60 22	63.6	60 15	58 34	62.0	59 46	56 49	60.5	59 16	55 06	59.1	244	296
65	115	62 26	63 18	66.0	62 01	61 21	64.2	61 34	59 28	62.6	61 06	57 37	61.0	60 36	55 51	59.4	60 05	54 07	57.9	245	295
66	114	63 20	62 25	65.0	62 53	60 25	63.2	62 26	58 30	61.5	61 54	56 37	59.8	61 25	54 49	58.2	60 53	53 04	56.7	246	294
67	113	64 13	61 27	63.9	63 45	59 25	62.1	63 16	57 27	60.3	62 46	55 34	58.6	62 14	53 44	57.0	61 41	51 57	55.4	247	293
68	112	65 05	60 26	62.8	64 37	58 21	60.9	64 07	56 21	59.1	63 35	54 25	57.4	63 02	52 34	55.7	62 27	50 47	54.1	248	292
69	111	65 57	59 20	61.6	65 27	57 13	59.6	64 56	55 10	57.8	64 23	53 13	56.0	63 49	51 20	54.3	63 14	49 32	52.7	249	291
70	110	66 48	58 08	60.3	66 18	55 59	58.3	65 45	53 55	56.4	65 11	51 55	54.6	64 36	50 01	52.9	63 59	48 12	51.2	250	290
71	109	67 39	56 52	58.9	67 07	54 40	56.8	66 33	52 33	54.9	65 58	50 33	53.1	65 21	48 38	51.3	64 43	46 48	49.7	251	289
72	108	68 29	55 29	57.4	67 55	53 14	55.3	67 20	51 06	53.3	66 44	49 04	51.5	66 06	47 08	49.7	65 26	45 18	48.0	252	288
73	107	69 18	53 59	55.8	68 43	51 42	53.7	68 07	49 33	51.6	67 29	47 30	49.8	66 49	45 33	48.0	66 08	43 43	46.3	253	287
74	106	70 06	52 22	54.1	69 30	50 03	51.9	68 52	47 52	49.8	68 12	45 49	47.9	67 31	43 52	46.1	66 49	42 02	44.4	254	286
75	105	70 53	50 36	52.2	70 15	48 16	50.0	69 36	46 04	47.9	68 55	44 00	46.0	68 12	42 04	44.2	67 29	40 15	42.5	255	285
76	104	71 38	48 42	50.2	70 59	46 20	47.9	70 18	44 08	45.9	69 36	42 05	43.9	68 52	40 09	42.1	68 07	38 21	40.5	256	284
77	103	72 23	46 37	48.0	71 42	44 15	45.7	70 59	42 03	43.7	70 15	40 01	41.7	69 30	38 07	39.9	68 43	36 21	38.3	257	283
78	102	73 06	44 22	45.6	72 23	42 00	43.4	71 38	39 49	41.3	70 53	37 49	39.4	70 06	35 57	37.6	69 18	34 13	36.0	258	282
79	101	73 47	41 55	43.1	73 02	39 34	40.8	72 16	37 26	38.8	71 28	35 27	36.9	70 40	33 38	35.2	69 50	31 58	33.6	259	281
80	100	74 26	39 15	40.3	73 39	36 57	38.1	72 51	34 51	36.1	72 02	32 57	34.3	71 12	31 12	32.6	70 21	29 36	31.1	260	280
81	99	75 02	36 21	37.3	74 14	34 07	35.1	73 24	32 06	33.2	72 34	30 17	31.5	71 42	28 37	29.9	70 50	27 06	28.4	261	279
82	98	75 37	33 13	34.1	74 46	31 05	32.0	73 55	29 10	30.2	73 03	27 27	28.5	72 09	25 53	27.0	71 16	24 29	25.7	262	278
83	97	76 08	29 50	30.6	75 16	27 50	28.6	74 23	26 03	26.9	73 29	24 27	25.4	72 34	23 02	24.0	71 39	21 44	22.8	263	277
84	96	76 36	26 11	26.8	75 42	24 22	25.0	74 48	22 45	23.5	73 52	21 19	22.1	72 56	20 02	20.9	72 00	18 53	19.8	264	276
85	95	77 01	22 18	22.8	76 05	20 41	21.3	75 09	19 16	19.9	74 12	18 01	18.7	73 15	16 54	17.6	72 18	15 55	16.7	265	275
86	94	77 22	18 10	18.6	76 25	16 49	17.3	75 27	15 38	16.1	74 29	14 36	15.1	73 31	13 40	14.2	72 33	12 51	13.5	266	274
87	93	77 38	13 50	14.1	76 40	12 46	13.1	75 41	11 51	12.2	74 43	11 03	11.4	73 44	10 21	10.8	72 45	9 43	10.2	267	273
88	92	77 50	9 19	9.5	76 51	8 36	8.8	75 52	7 58	8.2	74 52	7 25	7.7	73 53	6 56	7.2	72 53	6 31	6.8	268	272
89	91	77 58	4 42	4.8	76 58	4 19	4.4	75 58	4 00	4.1	74 58	3 44	3.9	73 58	3 29	3.6	72 58	3 16	3.4	269	271
90	90	78 00	0 00	0.0	77 00	0 00	0.0	76 00	0 00	0.0	75 00	0 00	0.0	74 00	0 00	0.0	73 00	0 00	0.0	270	270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

B: (-) for 90° < LHA < 270°
Dec: (-) for Lat. contrary name

Z₁: same sign as B
Z₂: (-) for F > 90°

Lat. / A		18°			19°			20°			21°			22°			23°			Lat. / A	
LHA/F	A/H	B/P	Z ₁ /Z ₂		A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	
0	0 180	0 00	0 00	90-0	0 00	71 00	90-0	0 00	70 00	90-0	0 00	69 00	90-0	0 00	68 00	90-0	0 00	67 00	90-0	180	360
1	0 179	0 57	0 57	89-7	0 57	71 00	89-7	0 56	70 00	89-7	0 56	69 00	89-6	0 56	68 00	89-6	0 55	67 00	89-6	181	359
2	0 178	1 54	1 54	89-4	1 53	70 59	89-3	1 53	69 59	89-3	1 52	68 59	89-3	1 51	67 59	89-3	1 50	66 59	89-2	182	358
3	0 177	2 51	2 51	89-1	2 50	70 59	89-0	2 49	69 58	89-0	2 48	68 58	88-9	2 47	67 58	88-9	2 46	66 58	88-8	183	357
4	0 176	3 48	3 48	88-8	3 47	70 57	88-7	3 46	69 57	88-6	3 44	68 57	88-6	3 42	67 57	88-5	3 41	66 57	88-4	184	356
5	0 175	4 45	4 45	88-5	4 44	70 56	88-4	4 42	69 56	88-3	4 40	68 56	88-2	4 38	67 55	88-1	4 36	66 55	88-0	185	355
6	0 174	5 42	5 42	88-1	5 40	70 54	88-0	5 38	69 54	87-9	5 36	68 54	87-8	5 34	67 53	87-7	5 31	66 53	87-6	186	354
7	0 173	6 39	6 39	87-8	6 37	70 52	87-7	6 35	69 52	87-6	6 32	68 51	87-5	6 29	67 51	87-4	6 26	66 51	87-3	187	353
8	0 172	7 36	7 36	87-5	7 34	70 50	87-4	7 31	69 49	87-2	7 28	68 49	87-1	7 25	67 48	87-0	7 22	66 48	86-9	188	352
9	0 171	8 33	8 33	87-2	8 30	70 47	87-0	8 27	69 46	86-9	8 24	68 46	86-8	8 20	67 45	86-6	8 17	66 45	86-5	189	351
10	0 170	9 30	9 30	86-9	9 27	70 44	86-7	9 23	69 43	86-5	9 20	68 42	86-4	9 16	67 42	86-2	9 12	66 41	86-1	190	350
11	0 169	10 27	10 27	86-6	10 24	70 40	86-4	10 20	69 39	86-2	10 16	68 39	86-0	10 11	67 38	85-8	10 07	66 37	85-7	191	349
12	0 168	11 24	11 24	86-2	11 20	70 36	86-0	11 16	69 35	85-8	11 12	68 34	85-6	11 07	67 33	85-4	11 02	66 32	85-3	192	348
13	0 167	12 21	12 21	85-9	12 17	70 32	85-7	12 12	69 31	85-5	12 07	68 30	85-3	12 02	67 29	85-1	11 57	66 28	84-8	193	347
14	0 166	13 18	13 18	85-6	13 13	70 28	85-4	13 08	69 26	85-1	13 03	68 25	84-9	12 58	67 24	84-7	12 52	66 22	84-4	194	346
15	0 165	14 15	14 15	85-3	14 10	70 23	85-0	14 05	69 21	84-8	13 59	68 20	84-5	13 53	67 18	84-3	13 47	66 17	84-0	195	345
16	0 164	15 12	15 12	84-9	15 06	70 18	84-7	15 01	69 16	84-4	14 55	68 14	84-1	14 48	67 12	83-9	14 42	66 10	83-6	196	344
17	0 163	16 09	16 09	84-6	16 03	70 12	84-3	15 57	69 10	84-0	15 50	68 08	83-7	15 44	67 06	83-5	15 37	66 04	83-2	197	343
18	0 162	17 05	17 05	84-3	16 59	70 06	84-0	16 53	69 03	83-7	16 46	68 01	83-4	16 39	66 59	83-1	16 32	65 57	82-8	198	342
19	0 161	18 02	18 02	83-9	17 56	69 59	83-6	17 49	68 57	83-3	17 42	67 54	83-0	17 34	66 52	82-7	17 26	65 49	82-4	199	341
20	0 160	18 59	18 59	83-6	18 52	69 53	83-2	18 45	68 50	82-9	18 37	67 47	82-6	18 29	66 44	82-2	18 21	65 41	81-9	200	340
21	0 159	19 56	19 56	83-2	19 48	69 45	82-9	19 41	68 42	82-5	19 33	67 39	82-2	19 24	66 36	81-8	19 16	65 33	81-5	201	339
22	0 158	20 52	20 52	82-9	20 45	69 38	82-5	20 37	68 34	82-1	20 28	67 31	81-8	20 19	66 27	81-4	20 10	65 24	81-0	202	338
23	0 157	21 49	21 49	82-5	21 41	69 29	82-1	21 32	68 26	81-7	21 24	67 22	81-4	21 14	66 18	81-0	21 05	65 15	80-6	203	337
24	0 156	22 45	22 45	82-2	22 37	69 21	81-8	22 28	68 17	81-3	22 19	67 12	80-9	22 09	66 09	80-5	21 59	65 05	80-1	204	336
25	0 155	23 42	23 42	81-8	23 33	69 12	81-4	23 24	68 07	80-9	23 14	67 03	80-5	23 04	65 58	80-1	22 54	64 54	79-7	205	335
26	0 154	24 38	24 38	81-4	24 29	69 02	81-0	24 20	67 57	80-5	24 09	66 52	80-1	23 59	65 48	79-6	23 48	64 43	79-2	206	334
27	0 153	25 35	25 35	81-1	25 25	68 52	80-6	25 15	67 47	80-1	25 05	66 42	79-7	24 54	65 36	79-2	24 42	64 32	78-7	207	333
28	0 152	26 31	26 31	80-7	26 21	68 42	80-2	26 11	67 36	79-7	26 00	66 30	79-2	25 48	65 25	78-7	25 36	64 19	78-3	208	332
29	0 151	27 27	27 27	80-3	27 17	68 31	79-8	27 06	67 24	79-3	26 55	66 18	78-8	26 43	65 12	78-3	26 30	64 07	77-8	209	331
30	0 150	28 24	28 24	79-9	28 13	68 19	79-4	28 01	67 12	78-8	27 50	66 06	78-3	27 37	64 59	77-8	27 24	63 53	77-3	210	330
31	0 149	29 20	29 20	79-5	29 09	68 07	78-9	28 57	67 00	78-4	28 44	65 53	77-8	28 31	64 46	77-3	28 18	63 39	76-8	211	329
32	0 148	30 16	30 16	79-1	30 04	67 54	78-5	29 52	66 46	77-9	29 39	65 39	77-4	29 26	64 32	76-8	29 12	63 25	76-3	212	328
33	0 147	31 12	31 12	78-7	31 00	67 41	78-1	30 47	66 32	77-5	30 34	65 24	76-9	30 20	64 17	76-3	30 05	63 09	75-8	213	327
34	0 146	32 08	32 08	78-2	31 55	67 27	77-6	31 42	66 18	77-0	31 28	65 09	76-4	31 14	64 01	75-8	31 01	62 53	75-2	214	326
35	0 145	33 04	33 04	77-8	32 51	67 12	77-2	32 37	66 03	76-5	32 23	64 54	75-9	32 08	63 45	75-3	31 52	62 36	74-7	215	325
36	0 144	33 59	33 59	77-3	33 46	66 57	76-7	33 32	65 47	76-0	33 17	64 37	75-4	33 01	63 28	74-8	32 45	62 19	74-2	216	324
37	0 143	34 55	34 55	76-9	34 41	66 41	76-2	34 26	65 30	75-5	34 11	64 20	74-9	33 55	63 10	74-2	33 38	62 01	73-6	217	323
38	0 142	35 50	35 50	76-4	35 36	66 24	75-7	35 21	65 13	75-0	35 05	64 02	74-4	34 48	62 51	73-7	34 31	61 41	73-0	218	322
39	0 141	36 46	36 46	76-0	36 31	66 06	75-2	36 15	64 54	74-5	35 59	63 43	73-8	35 42	62 32	73-1	35 24	61 21	72-4	219	321
40	0 140	37 41	37 41	75-5	37 26	65 48	74-7	37 10	64 35	74-0	36 53	63 23	73-3	36 35	62 12	72-6	36 17	61 01	71-8	220	320
41	0 139	38 36	38 36	75-0	38 20	65 29	74-2	38 04	64 15	73-4	37 46	63 02	72-7	37 28	61 50	72-0	37 09	60 39	71-2	221	319
42	0 138	39 31	39 31	74-5	39 15	65 08	73-7	38 58	63 54	72-9	38 40	62 41	72-1	38 21	61 28	71-4	38 01	60 16	70-6	222	318
43	0 137	40 26	40 26	73-9	40 09	64 47	73-1	39 51	63 33	72-3	39 33	62 18	71-5	39 13	61 05	70-7	38 53	59 52	70-0	223	317
44	0 136	41 21	41 21	73-4	41 03	64 25	72-5	40 45	63 10	71-7	40 26	61 55	70-9	40 06	60 41	70-1	39 45	59 27	69-3	224	316
45	0 135	42 16	42 16	72-8	41 57	64 02	72-0	41 38	62 46	71-1	41 19	61 30	70-3	40 58	60 15	69-5	40 37	59 01	68-7	225	315

Lat. / A		18°			19°			20°			21°			22°			23°			Lat. / A	
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	°	
45	135	42 16	65 19	72 8	41 57	64 02	72 0	41 38	62 46	71 1	41 19	61 30	70 3	40 58	60 15	69 5	40 37	59 01	68 7	225	315
46	134	43 10	64 56	72 3	42 51	63 38	71 4	42 32	62 21	70 5	42 11	61 05	69 6	41 50	59 49	68 8	41 28	58 34	68 0	226	314
47	133	44 04	64 32	71 7	43 45	63 13	70 8	43 25	61 55	69 9	43 04	60 38	69 0	42 42	59 21	68 1	42 19	58 06	67 3	227	313
48	132	44 58	64 06	71 1	44 38	62 46	70 1	44 18	61 57	69 2	44 18	60 09	68 3	43 33	58 53	67 4	43 10	57 37	66 5	228	312
49	131	45 52	63 39	70 4	45 32	62 18	69 5	45 10	60 59	68 5	44 48	59 40	67 6	44 24	58 22	66 7	44 00	57 06	65 8	229	311
50	130	46 46	63 11	69 8	46 25	61 49	68 8	46 03	60 29	67 8	45 39	59 09	66 9	45 15	57 51	65 9	44 50	56 34	65 0	230	310
51	129	47 39	62 42	69 1	47 17	61 19	68 1	46 55	59 57	67 1	46 31	58 37	66 1	46 06	57 18	65 2	45 40	56 00	64 2	231	309
52	128	48 33	62 11	68 4	48 10	60 47	67 4	47 46	59 25	66 4	47 22	58 03	65 4	46 56	56 44	64 4	46 30	55 25	63 4	232	308
53	127	49 25	61 38	67 7	49 02	60 13	66 6	48 38	58 50	65 6	48 13	57 28	64 6	47 46	56 07	63 6	47 19	54 48	62 6	233	307
54	126	50 18	61 04	67 0	49 54	59 38	65 9	49 29	58 14	64 8	49 03	56 51	63 7	48 36	55 30	62 9	48 08	54 10	61 7	234	306
55	125	51 10	60 28	66 2	50 46	59 01	65 1	50 20	57 36	64 0	49 53	56 12	62 9	49 25	54 50	61 9	48 56	53 30	60 8	235	305
56	124	52 03	59 50	65 4	51 37	58 23	64 2	51 10	56 56	63 1	50 43	55 32	62 0	50 14	54 09	61 0	49 44	52 48	59 9	236	304
57	123	52 54	59 11	64 6	52 28	57 42	63 4	52 00	56 15	62 2	51 32	54 49	61 1	51 02	53 26	60 0	50 32	52 04	59 0	237	303
58	122	53 46	58 29	63 7	53 18	56 59	62 5	52 50	55 31	61 3	52 21	54 05	60 2	51 50	52 41	59 1	51 19	51 18	58 0	238	302
59	121	54 37	57 45	62 8	54 08	56 14	61 5	53 39	54 45	60 4	53 09	53 18	59 2	52 38	51 53	58 1	52 06	50 30	57 0	239	301
60	120	55 27	56 59	61 8	54 58	55 27	60 6	54 28	53 57	59 4	53 57	52 29	58 2	53 25	51 04	57 0	52 52	49 40	55 9	240	300
61	119	56 17	56 10	60 9	55 47	54 37	59 6	55 16	53 06	58 3	54 44	51 38	57 1	54 11	50 12	55 9	53 37	48 48	54 8	241	299
62	118	57 07	55 19	59 8	56 36	53 45	58 5	56 04	52 13	57 2	55 31	50 44	56 0	54 57	49 17	54 8	54 22	47 53	53 7	242	298
63	117	57 56	54 25	58 8	57 24	52 49	57 4	56 51	51 17	56 1	56 17	49 47	54 9	55 42	48 20	53 7	55 06	46 55	52 5	243	297
64	116	58 44	53 27	57 6	58 12	51 51	56 3	57 38	50 18	55 0	57 03	48 48	53 7	56 27	47 20	52 5	55 50	45 55	51 3	244	296
65	115	59 32	52 27	56 5	58 58	50 50	55 1	58 24	49 16	53 7	57 47	47 45	52 5	57 10	46 17	51 2	56 32	44 52	50 0	245	295
66	114	60 19	51 23	55 2	59 45	49 45	53 8	59 09	48 11	52 5	58 32	46 39	51 2	57 53	45 11	49 9	57 14	43 47	48 7	246	294
67	113	61 06	50 15	53 9	60 30	48 37	52 5	59 53	47 02	51 1	59 15	45 30	49 8	58 36	44 02	48 6	57 55	42 38	47 4	247	293
68	112	61 52	49 04	52 6	61 15	47 25	51 1	60 36	45 50	49 8	59 57	44 18	48 4	59 17	42 50	47 2	58 36	41 26	46 0	248	292
69	111	62 37	47 48	51 2	61 58	46 09	49 7	61 19	44 33	48 3	60 39	43 02	47 0	59 57	41 34	45 7	59 15	40 10	44 5	249	291
70	110	63 21	46 28	49 7	62 41	44 48	48 2	62 01	43 13	46 8	61 19	41 42	45 4	60 36	40 15	44 2	60 30	38 52	43 0	250	290
71	109	64 04	45 03	48 1	63 23	43 24	46 6	62 41	41 49	45 2	61 58	40 18	43 9	61 15	38 52	42 6	60 30	37 29	41 4	251	289
72	108	64 45	43 34	46 4	64 04	41 54	44 9	63 21	40 20	43 5	62 37	38 50	42 2	61 52	37 25	40 9	61 06	36 03	39 7	252	288
73	107	65 26	41 59	44 7	64 43	40 20	43 2	63 59	38 46	41 8	63 14	37 18	40 5	62 27	35 53	39 2	62 14	34 34	38 0	253	287
74	106	66 06	40 19	42 9	65 21	38 41	41 4	64 36	37 08	40 0	63 49	35 41	38 7	63 02	34 18	37 4	62 14	33 00	36 3	254	286
75	105	66 44	38 32	40 9	65 58	36 56	39 5	65 11	35 25	38 1	64 23	33 59	36 8	63 35	32 39	35 6	62 46	31 22	34 4	255	285
76	104	67 20	36 40	38 9	66 33	35 05	37 4	65 45	33 37	36 1	64 56	32 13	34 8	64 07	30 55	33 6	63 16	29 41	32 5	256	284
77	103	67 55	34 42	36 8	67 07	33 09	35 3	66 18	31 43	34 0	65 27	30 22	32 8	64 37	29 06	31 6	63 45	27 55	30 6	257	283
78	102	68 29	32 37	34 5	67 39	31 07	33 1	66 48	29 44	31 9	65 57	28 26	30 7	65 05	27 14	29 6	64 13	26 06	28 5	258	282
79	101	69 00	30 25	32 2	68 09	29 00	30 8	67 17	27 40	29 6	66 25	26 26	28 5	65 32	25 17	27 4	64 38	24 12	26 4	259	281
80	100	69 29	28 07	29 7	68 37	26 46	28 4	67 44	25 30	27 3	66 50	24 20	26 2	65 56	23 15	25 2	65 02	22 15	24 3	260	280
81	99	69 57	25 43	27 1	69 03	24 26	25 9	68 09	23 15	24 8	67 14	22 10	23 8	66 19	21 10	22 9	65 23	20 14	22 1	261	279
82	98	70 21	23 11	24 5	69 27	22 00	23 3	68 31	20 56	22 3	67 36	19 56	21 4	66 40	19 00	20 6	65 43	18 09	19 8	262	278
83	97	70 44	20 34	21 7	69 48	19 29	20 7	68 51	18 31	19 7	67 55	17 37	18 9	66 58	16 47	18 1	66 01	16 01	17 4	263	277
84	96	71 03	17 50	18 8	70 07	16 53	17 9	69 09	16 01	17 1	68 12	15 14	16 3	67 14	14 30	15 7	66 16	13 50	15 1	264	276
85	95	71 20	15 01	15 8	70 23	14 12	15 0	69 25	13 28	14 3	68 26	12 48	13 7	67 28	12 10	13 1	66 29	11 36	12 6	265	275
86	94	71 35	12 07	12 8	70 36	11 27	12 1	69 37	10 51	11 6	68 38	10 18	11 0	67 39	9 48	10 6	66 40	9 20	10 1	266	274
87	93	71 46	9 09	9 6	70 46	8 39	9 1	69 47	8 11	8 7	68 48	7 46	8 3	67 48	7 23	8 0	66 49	7 02	7 6	267	273
88	92	71 54	6 08	6 4	70 54	5 47	6 1	69 54	5 29	5 8	68 55	5 12	5 6	67 55	4 56	5 3	66 55	4 42	5 1	268	272
89	91	71 58	3 04	3 2	70 58	2 54	3 1	69 59	2 45	2 9	68 59	2 36	2 8	67 59	2 28	2 7	66 59	2 21	2 6	269	271
90	90	72 00	0 00	0 0	71 00	0 00	0 0	70 00	0 00	0 0	69 00	0 00	0 0	68 00	0 00	0 0	67 00	0 00	0 0	270	270

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

SIGHT REDUCTION TABLE

B: (-) for 90° < LHA < 270°
Dec: (-) for Lat. contrary name

24°		25°		26°		27°		28°		29°		Lat. / A	
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
0	0 00	66 00	90-0	0 00	64 00	90-0	0 00	63 00	90-0	0 00	61 00	90-0	180
1	0 55	66 00	89-6	0 54	64 00	89-6	0 53	63 00	89-5	0 52	61 00	89-5	181
2	1 50	65 59	89-2	1 49	63 59	89-1	1 47	62 59	89-1	1 45	60 59	89-0	182
3	2 44	65 58	88-8	2 43	63 58	88-7	2 40	62 58	88-6	2 37	60 58	88-5	183
4	3 39	65 57	88-4	3 37	63 57	88-2	3 34	62 57	88-2	3 30	60 56	88-1	184
5	4 34	65 55	88-0	4 32	63 55	87-8	4 27	62 55	87-7	4 22	60 54	87-6	185
6	5 29	65 53	87-6	5 26	63 53	87-4	5 21	62 52	87-3	5 15	60 52	87-1	186
7	6 24	65 50	87-1	6 20	63 50	86-9	6 14	62 50	86-8	6 07	60 49	86-6	187
8	7 18	65 47	86-7	7 15	63 47	86-5	7 07	62 46	86-3	6 59	60 46	86-1	188
9	8 13	65 44	86-3	8 09	63 44	86-2	8 01	62 43	85-9	7 52	60 42	85-6	189
10	9 08	65 40	85-9	9 03	63 40	85-7	8 54	62 39	85-4	8 44	60 38	85-1	190
11	10 02	65 36	85-5	9 57	63 35	85-3	9 47	62 34	85-0	9 36	60 33	84-6	191
12	10 57	65 32	85-1	10 52	63 31	84-9	10 41	62 29	84-5	10 29	60 28	84-1	192
13	11 52	65 27	84-6	11 46	63 26	84-4	11 34	62 24	84-0	11 21	60 22	83-6	193
14	12 46	65 21	84-2	12 40	63 20	84-0	12 27	62 18	83-5	12 13	60 16	83-1	194
15	13 41	65 15	83-8	13 34	63 14	83-5	13 20	62 11	83-1	13 05	60 09	82-6	195
16	14 35	65 09	83-3	14 28	63 08	83-1	14 13	62 04	82-6	13 57	60 02	82-1	196
17	15 29	65 02	82-9	15 22	63 00	82-6	15 06	61 57	82-1	14 49	59 54	81-6	197
18	16 24	64 55	82-5	16 16	62 53	82-2	15 59	61 49	81-6	15 41	59 46	81-0	198
19	17 18	64 47	82-0	17 10	62 45	81-7	16 52	61 41	80-6	16 33	59 37	80-5	199
20	18 12	64 39	81-6	18 03	62 36	81-3	17 45	61 32	80-1	17 24	59 28	80-0	200
21	19 07	64 30	81-1	18 57	62 28	80-8	18 37	61 23	80-1	18 16	59 18	79-5	201
22	20 01	64 21	80-7	19 51	62 18	80-3	19 30	61 13	79-6	19 08	59 08	78-9	202
23	20 55	64 11	80-2	20 44	62 08	79-8	20 22	61 02	79-1	19 59	58 57	78-4	203
24	21 49	64 01	79-7	21 38	62 58	79-3	21 15	60 51	78-6	20 50	58 45	77-8	204
25	22 43	63 50	79-3	22 31	62 46	78-9	22 07	60 39	78-0	21 42	58 33	77-3	205
26	23 36	63 39	78-8	23 25	62 35	78-4	22 59	60 27	77-5	22 33	58 20	76-7	206
27	24 30	63 27	78-3	24 18	62 22	77-8	23 52	60 14	77-0	23 24	58 07	76-1	207
28	25 24	63 14	77-8	25 11	62 10	77-3	24 44	60 01	76-4	24 15	57 53	75-5	208
29	26 17	63 01	77-3	26 04	61 56	76-8	25 36	59 47	75-9	25 05	57 38	75-0	209
30	27 11	62 48	76-8	26 57	61 42	76-3	26 27	59 32	75-3	25 56	57 23	74-4	210
31	28 04	62 33	76-3	27 50	61 27	75-8	27 19	59 16	74-7	26 46	57 07	73-8	211
32	28 57	62 18	75-7	28 42	61 12	75-2	28 10	59 00	74-2	27 03	56 50	73-1	212
33	29 50	62 02	75-2	29 35	60 56	74-7	28 58	58 43	73-6	28 27	56 32	72-5	213
34	30 43	61 46	74-7	30 27	60 39	74-1	29 53	58 26	73-0	29 17	56 14	71-9	214
35	31 36	61 28	74-1	31 19	60 21	73-5	30 44	58 07	72-4	30 07	55 55	71-2	215
36	32 29	61 10	73-5	32 11	60 02	72-9	31 35	57 48	71-7	30 56	55 35	70-6	216
37	33 21	60 52	73-0	33 03	59 43	72-3	32 26	57 28	71-1	31 46	55 14	69-9	217
38	34 13	60 32	72-4	33 55	59 23	71-7	33 16	57 07	70-5	32 35	54 53	69-3	218
39	35 06	60 11	71-8	34 47	59 02	71-1	34 06	56 45	69-8	33 24	54 30	68-6	219
40	35 58	59 50	71-2	35 38	58 40	70-5	35 17	56 22	69-1	34 12	54 07	67-9	220
41	36 49	59 28	70-5	36 29	58 17	69-8	36 08	55 59	68-5	35 01	53 42	67-1	221
42	37 41	59 04	69-9	37 20	57 54	69-2	36 58	55 34	67-8	35 49	53 17	66-4	222
43	38 32	58 40	69-2	38 11	57 29	68-5	37 48	55 08	67-1	36 37	52 50	65-7	223
44	39 23	58 15	68-6	39 01	57 03	67-8	38 14	54 41	66-3	37 25	52 23	64-9	224
45	40 14	57 48	67-9	39 51	56 36	67-1	39 03	54 13	65-6	38 12	51 54	64-1	225

Lat. / A	24°			25°			26°			27°			28°			29°			Lat. / A
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	40 14	57 48	67.9	39 51	56 36	67.1	39 28	55 24	66.3	39 03	54 13	65.6	38 38	53 04	64.9	38 12	51 54	64.1	225
46	41 05	57 21	67.2	40 41	56 08	66.4	40 17	54 56	65.6	39 52	53 44	64.8	39 26	52 34	64.1	38 59	51 25	63.3	226
47	41 55	56 52	66.4	41 31	55 38	65.6	41 06	54 26	64.8	40 40	53 14	64.0	40 13	52 04	63.3	39 46	50 54	62.5	227
48	42 45	56 22	65.7	42 20	55 08	64.9	41 54	53 55	64.0	41 28	52 43	63.2	41 00	51 32	62.5	40 32	50 22	61.7	228
49	43 35	55 50	64.9	43 09	54 36	64.1	42 43	53 22	63.2	42 15	52 10	62.4	41 47	50 59	61.6	41 18	49 48	60.9	229
50	44 25	55 17	64.1	43 58	54 02	63.3	43 31	52 49	62.4	43 03	51 36	61.6	42 34	50 24	60.8	42 04	49 14	60.0	230
51	45 14	54 43	63.3	44 47	53 28	62.4	44 18	52 13	61.6	43 49	51 00	60.7	43 20	49 48	59.9	42 49	48 38	59.1	231
52	46 03	54 08	62.5	45 35	52 52	61.6	45 06	51 37	60.7	44 36	50 23	59.8	44 05	49 11	59.0	43 34	48 00	58.2	232
53	46 51	53 30	61.6	46 22	52 14	60.7	45 52	50 59	59.8	45 22	49 45	58.9	44 51	48 32	58.1	44 18	47 21	57.2	233
54	47 39	52 51	60.8	47 09	51 34	59.8	46 39	50 19	58.9	46 07	49 05	58.0	45 35	47 52	57.1	45 02	46 41	56.3	234
55	48 27	52 11	59.8	47 56	50 53	58.9	47 25	49 37	58.0	46 53	48 23	57.0	46 19	47 10	56.2	45 46	45 59	55.3	235
56	49 14	51 28	58.9	48 43	50 11	57.9	48 10	48 54	57.0	47 37	47 40	56.1	47 03	46 27	55.2	46 29	45 15	54.3	236
57	50 01	50 44	57.9	49 28	49 26	56.9	48 55	48 09	56.0	48 21	46 54	55.0	47 46	45 41	54.1	47 11	44 30	53.3	237
58	50 47	49 58	56.9	50 14	48 39	55.9	49 40	47 22	54.9	49 05	46 07	54.0	48 29	44 54	53.1	47 53	43 43	52.2	238
59	51 33	49 09	55.9	50 58	47 51	54.9	50 23	46 34	53.9	49 48	45 18	52.9	49 11	44 05	52.0	48 34	42 54	51.1	239
60	52 18	48 19	54.8	51 43	47 00	53.8	51 07	45 43	52.8	50 30	44 28	51.8	49 53	43 14	50.9	49 14	42 03	50.0	240
61	53 02	47 26	53.7	52 26	46 07	52.7	51 49	44 50	51.7	51 12	43 35	50.7	50 33	42 22	49.7	49 54	41 10	48.8	241
62	53 46	46 31	52.6	53 09	45 12	51.5	52 31	43 54	50.5	51 53	42 39	49.5	51 13	41 27	48.6	50 33	40 16	47.6	242
63	54 29	45 33	51.4	53 51	44 14	50.3	53 13	42 57	49.3	52 33	41 42	48.3	51 53	40 30	47.3	51 12	39 19	46.4	243
64	55 12	44 33	50.2	54 33	43 14	49.1	53 53	41 57	48.1	53 13	40 42	47.1	52 31	39 30	46.1	51 49	38 20	45.2	244
65	55 53	43 30	48.9	55 13	42 11	47.8	54 33	40 55	46.8	53 51	39 40	45.8	53 09	38 29	44.8	52 26	37 19	43.9	245
66	56 34	42 25	47.6	55 53	41 06	46.5	55 12	39 50	45.4	54 29	38 36	44.4	53 46	37 25	43.5	53 02	36 16	42.6	246
67	57 14	41 16	46.2	56 32	39 58	45.1	55 50	38 42	44.1	55 06	37 29	43.1	54 22	36 19	42.1	53 37	35 11	41.2	247
68	57 53	40 05	44.8	57 10	38 47	43.7	56 27	37 32	42.7	55 42	36 19	41.7	54 57	35 10	40.7	54 11	34 03	39.8	248
69	58 32	38 50	43.3	57 47	37 33	42.2	57 03	36 18	41.2	56 17	35 07	40.2	55 31	33 59	39.3	54 44	32 53	38.4	249
70	59 09	37 32	41.8	58 24	36 16	40.7	57 38	35 02	39.7	56 51	33 52	38.7	56 04	32 45	37.8	55 16	31 41	36.9	250
71	59 45	36 11	40.2	58 58	34 55	39.2	58 12	33 43	38.1	57 24	32 35	37.2	56 36	31 29	36.3	55 47	30 26	35.4	251
72	60 19	34 46	38.6	59 32	33 32	37.6	58 44	32 21	36.5	57 56	31 14	35.6	57 07	30 10	34.7	56 17	29 08	33.8	252
73	60 53	33 18	36.9	60 05	32 05	35.9	59 16	30 56	34.9	58 26	29 51	34.0	57 36	28 48	33.1	56 46	27 49	32.2	253
74	61 25	31 46	35.2	60 36	30 35	34.2	59 46	29 28	33.2	58 55	28 25	32.3	58 05	27 24	31.4	57 13	26 26	30.6	254
75	61 56	30 10	33.4	61 06	29 02	32.4	60 15	27 57	31.4	59 23	26 56	30.5	58 31	25 57	29.7	57 39	25 02	28.9	255
76	62 26	28 31	31.5	61 34	27 25	30.5	60 42	26 23	29.6	59 50	25 24	28.8	58 57	24 28	28.0	58 04	23 35	27.2	256
77	62 53	26 48	29.6	62 01	25 45	28.6	61 08	24 46	27.8	60 15	23 49	27.0	59 21	22 56	26.2	58 27	22 05	25.5	257
78	63 20	25 02	27.6	62 26	24 02	26.7	61 32	23 05	25.9	60 38	22 12	25.1	59 44	21 21	24.4	58 49	20 34	23.7	258
79	63 44	23 12	25.5	62 50	22 15	24.7	61 55	21 22	23.9	61 00	20 32	23.2	60 05	19 44	22.5	59 09	19 00	21.8	259
80	64 07	21 18	23.4	63 12	20 25	22.6	62 16	19 36	21.9	61 20	18 49	21.2	60 24	18 05	20.6	59 28	17 24	20.0	260
81	64 28	19 22	21.3	63 32	18 33	20.5	62 35	17 47	19.9	61 39	17 04	19.2	60 42	16 24	18.6	59 45	15 46	18.1	261
82	64 47	17 22	19.1	63 50	16 37	18.4	62 53	15 56	17.8	61 56	15 17	17.2	60 58	14 40	16.7	60 01	14 06	16.2	262
83	65 03	15 18	16.8	64 06	14 39	16.2	63 08	14 02	15.6	62 10	13 27	15.1	61 12	12 55	14.7	60 14	12 24	14.2	263
84	65 18	13 13	14.5	64 20	12 38	14.0	63 22	12 06	13.5	62 23	11 36	13.0	61 25	11 07	12.6	60 26	10 41	12.2	264
85	65 31	11 05	12.1	64 32	10 35	11.7	63 33	10 08	11.3	62 35	9 42	10.9	61 36	9 19	10.6	60 37	8 56	10.2	265
86	65 41	8 54	9.8	64 42	8 30	9.4	63 43	8 08	9.1	62 44	7 48	8.8	61 44	7 28	8.5	60 45	7 10	8.2	266
87	65 49	6 42	7.3	64 50	6 24	7.1	63 50	6 07	6.8	62 51	5 52	6.6	61 51	5 37	6.4	60 52	5 24	6.2	267
88	65 55	4 29	4.9	64 56	4 17	4.7	63 56	4 06	4.6	62 56	3 55	4.4	61 56	3 45	4.3	60 56	3 36	4.1	268
89	65 59	2 15	2.5	64 59	2 09	2.4	63 59	2 03	2.3	62 59	1 58	2.2	61 59	1 53	2.1	60 59	1 48	2.0	269
90	66 00	0 00	0.0	65 00	0 00	0.0	64 00	0 00	0.0	63 00	0 00	0.0	62 00	0 00	0.0	61 00	0 00	0.0	270

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

B: (-) for 90° < LHA < 270°
Dec: (-) for Lat. contrary name

Z₁: same sign as B
Z₂: (-) for F > 90°

Lat. / A	30°			31°			32°			33°			34°			LHA				
	LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P		Z ₁ /Z ₂			
0	180	0 00	60 00	90-0	0 00	59 00	90-0	0 00	58 00	90-0	0 00	57 00	90-0	0 00	56 00	90-0	0 00	55 00	90-0	180
1	179	0 52	60 00	89-5	0 51	59 00	89-5	0 51	58 00	89-5	0 50	57 00	89-5	0 49	56 00	89-4	0 49	55 00	89-4	181
2	178	1 44	59 59	89-0	1 43	58 59	89-0	1 42	57 59	88-9	1 41	56 59	88-9	1 39	55 59	88-9	1 38	54 59	88-9	182
3	177	2 36	59 58	88-5	2 34	58 58	88-5	2 33	57 58	88-4	2 31	56 58	88-4	2 29	55 58	88-3	2 27	54 58	88-3	183
4	176	3 28	59 56	88-0	3 26	58 56	87-9	3 23	57 56	87-9	3 21	56 56	87-8	3 19	55 56	87-8	3 17	54 56	87-7	184
5	175	4 20	59 54	87-5	4 17	58 54	87-4	4 14	57 54	87-3	4 12	56 54	87-3	4 09	55 54	87-2	4 06	54 54	87-1	185
6	174	5 12	59 52	87-0	5 08	58 52	86-9	5 05	57 52	86-8	5 02	56 51	86-7	4 58	55 51	86-6	4 55	54 51	86-6	186
7	173	6 04	59 49	86-5	6 00	58 49	86-4	5 56	57 48	86-3	5 52	56 48	86-2	5 48	55 48	86-1	5 44	54 48	86-0	187
8	172	6 55	59 45	86-0	6 51	58 45	85-9	6 47	57 45	85-7	6 42	56 45	85-6	6 38	55 44	85-5	6 33	54 44	85-4	188
9	171	7 47	59 42	85-5	7 42	58 41	85-3	7 37	57 41	85-2	7 32	56 40	85-1	7 27	55 40	84-9	7 22	54 40	84-8	189
10	170	8 39	59 37	85-0	8 34	58 37	84-8	8 28	57 36	84-7	8 22	56 36	84-5	8 17	55 36	84-4	8 11	54 35	84-2	190
11	169	9 31	59 32	84-4	9 25	58 32	84-3	9 19	57 31	84-1	9 13	56 31	84-0	9 06	55 30	83-8	9 00	54 30	83-6	191
12	168	10 22	59 27	83-9	10 16	58 26	83-8	10 09	57 26	83-6	10 03	56 25	83-4	9 56	55 25	83-2	9 48	54 24	83-0	192
13	167	11 14	59 21	83-4	11 07	58 20	83-2	11 00	57 20	83-0	10 52	56 19	82-8	10 45	55 18	82-6	10 37	54 18	82-5	193
14	166	12 06	59 15	82-9	11 58	58 14	82-7	11 50	57 13	82-5	11 42	56 12	82-3	11 34	55 12	82-1	11 26	54 11	81-9	194
15	165	12 57	59 08	82-4	12 49	58 07	82-1	12 41	57 06	81-9	12 32	56 05	81-7	12 23	55 04	81-5	12 14	54 04	81-3	195
16	164	13 49	59 01	81-8	13 40	57 59	81-6	13 31	56 58	81-4	13 22	55 57	81-1	13 13	54 57	80-9	13 03	53 56	80-7	196
17	163	14 40	58 53	81-3	14 31	57 51	81-1	14 21	56 50	80-8	14 12	55 49	80-5	14 02	54 48	80-3	13 51	53 47	80-1	197
18	162	15 31	58 44	80-8	15 22	57 43	80-5	15 12	56 42	80-2	15 01	55 40	80-0	14 51	54 39	79-7	14 40	53 38	79-4	198
19	161	16 23	58 35	80-2	16 12	57 34	79-9	16 02	56 32	79-7	15 51	55 31	79-4	15 40	54 30	79-1	15 28	53 29	78-8	199
20	160	17 14	58 26	79-7	17 03	57 24	79-4	16 52	56 23	79-1	16 40	55 21	78-8	16 28	54 20	78-5	16 16	53 19	78-2	200
21	159	18 05	58 16	79-1	17 53	57 14	78-8	17 42	56 12	78-5	17 29	55 11	78-2	17 17	54 09	77-9	17 04	53 08	77-6	201
22	158	18 56	58 05	78-6	18 44	57 03	78-2	18 31	56 01	77-9	18 19	55 00	77-6	18 06	53 58	77-3	17 52	52 56	77-0	202
23	157	19 47	57 54	78-0	19 34	56 52	77-7	19 21	55 50	77-3	19 08	54 48	77-0	18 54	53 46	76-6	18 40	52 44	76-3	203
24	156	20 37	57 42	77-4	20 24	56 40	77-1	20 11	55 38	76-7	19 57	54 36	76-4	19 42	53 34	76-0	19 28	52 32	75-7	204
25	155	21 28	57 30	76-9	21 14	56 27	76-5	21 00	55 25	76-1	20 46	54 23	75-7	20 31	53 21	75-4	20 15	52 19	75-0	205
26	154	22 19	57 17	76-3	22 04	56 14	75-9	21 49	55 12	75-5	21 34	54 09	75-1	21 19	53 07	74-7	21 03	52 05	74-4	206
27	153	23 09	57 03	75-7	22 54	56 00	75-3	22 39	54 57	74-9	22 23	53 55	74-5	22 07	52 52	74-1	21 50	51 50	73-7	207
28	152	23 59	56 49	75-1	23 44	55 46	74-7	23 28	54 43	74-3	23 11	53 40	73-8	22 54	52 37	73-4	22 37	51 35	73-0	208
29	151	24 50	56 34	74-5	24 33	55 31	74-1	24 17	54 27	73-6	23 59	53 24	73-2	23 42	52 22	72-8	23 24	51 19	72-4	209
30	150	25 40	56 19	73-9	25 23	55 15	73-4	25 05	54 11	73-0	24 48	53 08	72-5	24 29	52 05	72-1	24 11	51 03	71-7	210
31	149	26 29	56 02	73-3	26 12	54 58	72-8	25 54	53 54	72-3	25 35	52 51	71-9	25 17	51 48	71-4	24 57	50 45	71-0	211
32	148	27 19	55 45	72-6	27 01	54 41	72-2	26 42	53 37	71-7	26 23	52 33	71-2	26 04	51 30	70-7	25 44	50 27	70-3	212
33	147	28 09	55 27	72-0	27 50	54 23	71-5	27 31	53 19	71-0	27 11	52 15	70-5	26 50	51 12	70-0	26 30	50 08	69-6	213
34	146	28 58	55 09	71-4	28 38	54 04	70-8	28 19	53 00	70-3	27 58	51 56	69-8	27 37	50 52	69-3	27 16	49 49	68-8	214
35	145	29 47	54 49	70-7	29 27	53 44	70-2	29 06	52 40	69-6	28 45	51 36	69-1	28 24	50 32	68-6	28 01	49 29	68-1	215
36	144	30 36	54 29	70-0	30 15	53 24	69-5	29 54	52 19	68-9	29 32	51 15	68-4	29 10	50 11	67-9	28 47	49 07	67-4	216
37	143	31 25	54 08	69-4	31 03	53 03	68-8	30 41	51 58	68-2	30 19	50 53	67-7	29 56	49 49	67-2	29 32	48 45	66-6	217
38	142	32 13	53 46	68-7	31 51	52 40	68-1	31 28	51 35	67-5	31 05	50 30	66-9	30 41	49 26	66-4	30 17	48 23	65-9	218
39	141	33 02	53 23	68-0	32 39	52 17	67-4	32 15	51 12	66-8	31 51	50 07	66-2	31 27	49 03	65-6	31 02	47 59	65-1	219
40	140	33 50	53 00	67-2	33 26	51 53	66-6	33 02	50 48	66-3	32 37	49 43	65-4	32 12	48 38	64-9	31 46	47 34	64-3	220
41	139	34 37	52 35	66-5	34 13	51 29	65-9	33 48	50 23	65-3	33 23	49 17	64-7	32 57	48 13	64-1	32 30	47 09	63-5	221
42	138	35 25	52 09	65-8	35 00	51 03	65-1	34 34	49 56	64-5	34 08	48 51	63-9	33 42	47 46	63-3	33 14	46 42	62-7	222
43	137	36 12	51 43	65-0	35 46	50 36	64-3	35 20	49 29	63-7	34 53	48 24	63-1	34 26	47 19	62-5	33 58	46 15	61-9	223
44	136	36 59	51 15	64-2	36 33	50 08	63-6	36 06	49 01	62-9	35 38	47 55	62-3	35 10	46 51	62-1	34 41	45 46	61-0	224
45	135	37 46	50 46	63-4	37 19	49 39	62-7	36 51	48 32	62-1	36 22	47 26	61-4	35 53	46 21	60-8	35 24	45 17	60-2	225

Lat. / A		30°			31°			32°			33°			34°			35°			Lat. / A	
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	°
45	135	37 46	50 46	63-4	37 19	49 39	62-7	36 51	48 32	62-1	36 22	47 26	61-4	35 53	46 21	60-8	35 24	45 17	60-2	225	315
46	134	38 32	50 16	62-6	38 04	49 08	61-9	37 36	48 02	61-2	37 06	46 56	60-6	36 37	45 51	59-9	36 06	44 46	59-3	226	314
47	133	39 18	49 45	61-8	38 49	48 37	61-1	38 20	47 30	60-4	37 50	46 24	59-7	37 19	45 19	59-1	36 48	44 15	58-4	227	313
48	132	40 04	49 13	61-0	39 34	48 05	60-2	39 04	46 58	59-5	38 33	45 51	58-8	38 02	44 46	58-2	37 30	43 42	57-5	228	312
49	131	40 49	48 39	60-1	40 19	47 31	59-4	39 48	46 24	58-6	39 16	45 18	57-9	38 44	44 12	57-2	38 11	43 08	56-6	229	311
50	130	41 34	48 04	59-2	41 03	46 56	58-5	40 31	45 49	57-7	39 59	44 42	57-0	39 26	43 37	56-3	38 52	42 33	55-6	230	310
51	129	42 18	47 28	58-3	41 46	46 20	57-5	41 14	45 12	56-8	40 41	44 06	56-1	40 07	43 01	55-4	39 32	41 57	54-7	231	309
52	128	43 02	46 50	57-4	42 29	45 42	56-6	41 56	44 34	55-9	41 22	43 28	55-1	40 47	42 23	54-4	40 12	41 19	53-7	232	308
53	127	43 46	46 11	56-4	43 12	45 03	55-6	42 38	43 55	54-9	42 03	42 49	54-1	41 28	41 44	53-4	40 52	40 41	52-7	233	307
54	126	44 29	45 31	55-5	43 54	44 22	54-7	43 19	43 15	53-9	42 44	42 09	53-1	42 07	41 04	52-4	41 30	40 01	51-7	234	306
55	125	45 11	44 49	54-5	44 36	43 40	53-7	44 00	42 33	52-9	43 24	41 27	52-1	42 46	40 23	51-4	42 09	39 19	50-7	235	305
56	124	45 53	44 05	53-5	45 17	42 57	52-6	44 40	41 50	51-8	44 03	40 44	51-1	43 25	39 40	50-3	42 46	38 37	49-6	236	304
57	123	46 35	43 20	52-4	45 58	42 11	51-6	45 20	41 05	50-8	44 42	39 59	50-0	44 03	38 55	49-3	43 24	37 53	48-5	237	303
58	122	47 16	42 33	51-3	46 38	41 25	50-5	45 59	40 18	49-7	45 20	39 13	48-9	44 40	38 09	48-2	44 00	37 07	47-5	238	302
59	121	47 56	41 44	50-2	47 17	40 36	49-4	46 38	39 30	48-6	45 58	38 25	47-8	45 17	37 22	47-1	44 36	36 20	46-3	239	301
60	120	48 35	40 54	49-1	47 56	39 46	48-3	47 16	38 40	47-5	46 35	37 36	46-7	45 53	36 33	45-9	45 11	35 32	45-2	240	300
61	119	49 14	40 01	47-9	48 34	38 54	47-1	47 53	37 48	46-3	47 11	36 45	45-5	46 29	35 42	44-7	45 46	34 42	44-0	241	299
62	118	49 53	39 07	46-8	49 11	38 00	45-9	48 29	36 55	45-1	47 46	35 52	44-3	47 03	34 50	43-6	46 19	33 50	42-8	242	298
63	117	50 30	38 11	45-5	49 48	37 04	44-7	49 05	36 00	43-9	48 21	34 57	43-1	47 37	33 57	42-3	46 53	32 57	41-6	243	297
64	116	51 07	37 13	44-3	50 23	36 07	43-4	49 40	35 03	42-6	48 55	34 01	41-8	48 10	33 01	41-1	47 25	32 03	40-4	244	296
65	115	51 43	36 12	43-0	50 58	35 07	42-2	50 14	34 04	41-3	49 28	33 03	40-6	48 43	32 04	39-8	47 56	31 07	39-1	245	295
66	114	52 18	35 10	41-7	51 33	34 06	40-8	50 47	33 04	40-0	50 01	32 04	39-3	49 14	31 05	38-5	48 27	30 09	37-8	246	294
67	113	52 52	34 05	40-3	52 06	33 02	39-5	51 19	32 01	38-7	50 32	31 02	37-9	49 44	30 05	37-2	48 56	29 10	36-5	247	293
68	112	53 25	32 59	38-9	52 38	31 56	38-1	51 50	30 57	37-3	51 02	29 59	36-6	50 14	29 03	35-8	49 25	28 09	35-2	248	292
69	111	53 57	31 50	37-5	53 09	30 49	36-7	52 21	29 50	35-9	51 32	28 53	35-2	50 43	27 59	34-5	49 53	27 06	33-8	249	291
70	110	54 28	30 39	36-1	53 39	29 39	35-2	52 50	28 42	35-0	52 00	27 46	33-8	51 10	26 53	33-1	50 20	26 02	32-4	250	290
71	109	54 58	29 25	34-6	54 08	28 27	33-8	53 18	27 31	33-0	52 28	26 38	32-3	51 37	25 46	31-6	50 46	24 56	31-0	251	289
72	108	55 27	28 09	33-0	54 37	27 13	32-2	53 46	26 19	31-5	52 54	25 27	30-8	52 03	24 37	30-2	51 10	23 49	29-5	252	288
73	107	55 55	26 51	31-4	55 03	25 57	30-7	54 12	25 04	30-0	53 19	24 14	29-3	52 27	23 26	28-7	51 34	22 40	28-1	253	287
74	106	56 21	25 31	29-8	55 29	24 39	29-1	54 36	23 48	28-4	53 43	23 00	27-8	52 50	22 14	27-1	51 57	21 29	26-6	254	286
75	105	56 46	24 09	28-2	55 53	23 18	27-5	55 00	22 30	26-8	54 06	21 44	26-2	53 12	21 00	25-6	52 18	20 17	25-0	255	285
76	104	57 10	22 44	26-5	56 16	21 56	25-8	55 22	21 10	25-2	54 28	20 26	24-6	53 33	19 44	24-0	52 38	19 04	23-5	256	284
77	103	57 33	21 17	24-8	56 38	20 31	24-1	55 43	19 48	23-5	54 48	19 06	23-0	53 53	18 27	22-4	52 57	17 49	21-9	257	283
78	102	57 54	19 48	23-0	56 59	19 05	22-4	56 03	18 24	21-9	55 07	17 45	21-3	54 11	17 08	20-8	53 15	16 32	20-3	258	282
79	101	58 13	18 17	21-2	57 17	17 37	20-7	56 21	16 59	20-1	55 25	16 22	19-6	54 28	15 48	19-2	53 31	15 15	18-7	259	281
80	100	58 32	16 44	19-4	57 35	16 07	18-9	56 38	15 32	18-4	55 41	14 58	17-9	54 44	14 26	17-5	53 47	13 56	17-1	260	280
81	99	58 48	15 10	17-6	57 51	14 36	17-1	56 53	14 03	16-6	55 56	13 33	16-2	54 58	13 03	15-8	54 00	12 36	15-4	261	279
82	98	59 03	13 33	15-7	58 05	13 02	15-3	57 07	12 33	14-9	56 09	12 06	14-5	55 11	11 40	14-1	54 13	11 14	13-8	262	278
83	97	59 16	11 55	13-8	58 18	11 28	13-4	57 19	11 02	13-0	56 21	10 30	12-7	55 22	10 14	12-4	54 24	9 52	12-1	263	277
84	96	59 28	10 16	11-9	58 29	9 52	11-5	57 30	9 30	11-2	56 31	9 09	10-9	55 32	8 49	10-6	54 33	8 29	10-4	264	276
85	95	59 37	8 35	9-9	58 38	8 15	9-6	57 39	7 56	9-4	56 40	7 39	9-1	55 41	7 22	8-9	54 41	7 06	8-7	265	275
86	94	59 46	6 53	8-0	58 46	6 37	7-7	57 47	6 22	7-5	56 47	6 08	7-3	55 48	5 54	7-1	54 48	5 41	7-0	266	274
87	93	59 52	5 11	6-0	58 52	4 59	5-8	57 52	4 47	5-6	56 53	4 36	5-5	55 53	4 26	5-4	54 53	4 16	5-2	267	273
88	92	59 56	3 28	4-0	58 57	3 19	3-9	57 57	3 12	3-8	56 57	3 05	3-7	55 57	2 58	3-6	54 57	2 51	3-5	268	272
89	91	59 59	1 44	2-0	58 59	1 40	1-9	57 59	1 36	1-9	56 59	1 32	1-8	55 59	1 29	1-8	54 59	1 26	1-7	269	271
90	90	60 00	0 00	0-0	59 00	0 00	0-0	58 00	0 00	0-0	57 00	0 00	0-0	56 00	0 00	0-0	55 00	0 00	0-0	270	270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

B: (—) for 90° < LHA < 270°
Dec: (—) for Lat. contrary name
Z₁: same sign as B
Z₂: (—) for F > 90°

Lat. / A	36°			37°			38°			39°			40°			LHA
	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	
0	0 00	54 00	90-0	0 00	53 00	90-0	0 00	52 00	90-0	0 00	51 00	90-0	0 00	49 00	90-0	180
1	0 49	54 00	89-4	0 48	53 00	89-4	0 47	52 00	89-4	0 47	51 00	89-4	0 46	49 00	89-3	181
2	1 37	53 59	88-8	1 36	52 59	88-8	1 35	51 59	88-8	1 33	50 59	88-7	1 32	48 59	88-7	182
3	2 26	53 58	88-2	2 24	52 58	88-2	2 22	51 58	88-2	2 20	50 58	88-1	2 18	48 58	88-0	183
4	3 14	53 56	87-6	3 12	52 56	87-6	3 09	51 56	87-5	3 06	50 56	87-5	3 04	48 56	87-4	184
5	4 03	53 54	87-1	3 59	52 54	87-0	3 56	51 54	86-9	3 53	50 54	86-8	3 50	48 54	86-7	185
6	4 51	53 51	86-5	4 47	52 51	86-4	4 43	51 51	86-3	4 40	50 51	86-2	4 36	48 51	86-1	186
7	5 39	53 48	85-9	5 35	52 48	85-8	5 31	51 48	85-7	5 26	50 47	85-6	5 21	48 47	85-5	187
8	6 28	53 44	85-3	6 23	52 44	85-2	6 18	51 44	85-1	6 13	50 44	84-9	6 07	48 43	84-8	188
9	7 16	53 40	84-7	7 11	52 39	84-6	7 05	51 39	84-4	6 59	50 39	84-3	6 53	48 39	84-1	189
10	8 05	53 35	84-1	7 58	52 35	83-9	7 52	51 34	83-8	7 45	50 34	83-7	7 39	48 34	83-5	190
11	8 53	53 30	83-5	8 46	52 29	83-3	8 39	51 29	83-2	8 32	50 29	83-0	8 24	48 28	82-7	191
12	9 41	53 24	82-9	9 33	52 23	82-7	9 26	51 23	82-5	9 18	50 23	82-4	9 10	48 22	82-1	192
13	10 29	53 17	82-3	10 21	52 17	82-1	10 13	51 17	81-9	10 04	50 16	81-7	9 55	48 16	81-4	193
14	11 17	53 10	81-7	11 08	52 10	81-5	10 59	51 10	81-3	10 50	50 09	81-1	10 41	48 09	80-7	194
15	12 05	53 03	81-0	11 56	52 02	80-8	11 46	51 02	80-6	11 36	50 02	80-4	11 26	48 01	80-0	195
16	12 53	52 55	80-4	12 43	51 54	80-2	12 33	50 54	80-0	12 22	49 53	79-8	12 11	47 53	79-3	196
17	13 41	52 46	79-8	13 30	51 46	79-6	13 19	50 45	79-3	13 08	49 45	79-1	12 57	47 44	78-7	197
18	14 29	52 37	79-2	14 17	51 37	78-9	14 06	50 36	78-7	13 54	49 35	78-4	13 42	47 34	78-0	198
19	15 16	52 28	78-6	15 04	51 27	78-3	14 52	50 26	78-0	14 39	49 25	77-8	14 27	47 24	77-3	199
20	16 04	52 17	77-9	15 51	51 16	77-6	15 38	50 16	77-4	15 25	49 15	77-1	15 11	47 14	76-6	200
21	16 50	52 07	77-3	16 38	51 05	77-0	16 24	50 05	76-7	16 10	49 04	76-4	15 56	47 03	75-9	201
22	17 39	51 55	76-6	17 24	50 54	76-3	17 10	49 53	76-0	16 56	48 52	75-7	16 41	46 51	75-2	202
23	18 26	51 43	76-0	18 11	50 42	75-7	17 56	49 41	75-4	17 41	48 40	75-0	17 25	46 38	74-4	203
24	19 13	51 30	75-3	18 57	50 29	75-0	18 42	49 28	74-7	18 26	48 27	74-3	18 09	46 25	73-7	204
25	20 00	51 17	74-7	19 44	50 15	74-3	19 27	49 14	74-0	19 10	48 13	73-6	18 53	46 12	73-0	205
26	20 46	51 03	74-0	20 30	50 01	73-6	20 13	49 00	73-3	19 55	47 59	72-9	19 37	45 57	72-3	206
27	21 33	50 48	73-3	21 15	49 47	73-0	20 58	48 45	72-6	20 40	47 44	72-2	20 21	45 42	71-5	207
28	22 19	50 33	72-6	22 01	49 31	72-3	21 43	48 30	71-9	21 24	47 28	71-5	21 05	45 27	70-8	208
29	23 06	50 17	72-0	22 47	49 15	71-6	22 28	48 14	71-2	22 08	47 12	70-8	21 48	45 11	70-0	209
30	23 52	50 00	71-3	23 32	48 58	70-8	23 12	47 57	70-4	22 52	46 55	70-0	22 31	44 54	69-3	210
31	24 37	49 43	70-5	24 17	48 41	70-1	23 57	47 39	69-7	23 36	46 38	69-3	23 14	44 36	68-5	211
32	25 23	49 25	69-8	25 02	48 23	69-4	24 41	47 21	69-0	24 19	46 19	68-5	23 57	44 17	67-7	212
33	26 09	49 06	69-1	25 47	48 04	68-7	25 25	47 02	68-2	25 02	46 00	67-8	24 40	43 58	66-9	213
34	26 54	48 46	68-4	26 32	47 44	67-9	26 09	46 42	67-4	25 45	45 40	67-0	25 22	43 39	66-1	214
35	27 39	48 26	67-6	27 16	47 23	67-1	26 52	46 21	66-7	26 28	45 20	66-2	26 04	43 18	65-3	215
36	28 24	48 04	66-9	28 00	47 02	66-4	27 36	46 00	65-9	27 11	44 58	65-4	26 46	42 57	64-5	216
37	29 08	47 42	66-1	28 44	46 40	65-6	28 19	45 38	65-1	27 53	44 36	64-6	27 27	42 34	63-7	217
38	29 52	47 19	65-3	29 27	46 17	64-8	29 01	45 15	64-3	28 35	44 13	63-8	28 08	42 12	62-9	218
39	30 36	46 56	64-5	30 10	45 53	64-0	29 44	44 51	63-5	29 17	43 49	63-0	28 49	41 48	62-0	219
40	31 20	46 31	63-7	30 53	45 28	63-2	30 26	44 26	62-7	29 58	43 25	62-2	29 30	41 23	61-2	220
41	32 03	46 05	62-9	31 36	45 03	62-4	31 08	44 01	61-8	30 39	42 59	61-3	30 10	40 58	60-3	221
42	32 46	45 39	62-1	32 18	44 36	61-5	31 49	43 34	61-0	31 20	42 33	60-5	30 50	40 32	59-4	222
43	33 29	45 11	61-3	33 00	44 09	60-7	32 30	43 07	60-1	32 00	42 05	59-6	31 30	40 04	58-5	223
44	34 12	44 43	60-4	33 42	43 40	59-8	33 11	42 38	59-3	32 40	41 37	58-7	32 09	39 36	57-6	224
45	34 54	44 13	59-6	34 23	43 11	59-0	33 52	42 09	58-4	33 20	41 08	57-8	32 48	39 08	56-7	225

Lat. / A	36°			37°			38°			39°			40°			41°			Lat. / A
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	34 54	44 13	59.6	34 23	43 11	59.0	33 52	42 09	58.4	33 20	41 08	57.8	32 48	40 07	57.3	32 15	39 08	56.7	225
46	35 35	43 43	58.7	35 04	42 40	58.1	34 32	41 38	57.5	33 59	40 37	56.9	33 26	39 37	56.4	32 53	38 38	55.8	315
47	36 17	43 11	57.8	35 44	42 09	57.2	35 12	41 07	56.6	34 38	40 06	56.0	34 04	39 06	55.4	33 30	38 07	54.9	226
48	36 57	42 39	56.9	36 24	41 36	56.2	35 50	40 35	55.6	35 17	39 34	55.0	34 42	38 34	54.5	34 07	37 35	53.9	227
49	37 38	42 05	55.9	37 04	41 03	55.3	36 30	40 01	54.7	35 55	39 01	54.1	35 19	38 01	53.5	34 43	37 03	53.0	228
50	38 18	41 30	55.0	37 43	40 28	54.4	37 08	39 27	53.7	36 32	38 27	53.1	35 56	37 27	52.5	35 19	36 29	52.0	229
51	38 57	40 54	54.0	38 22	39 52	53.4	37 46	38 51	52.8	37 09	37 51	52.1	36 32	36 52	51.6	35 55	35 54	51.0	230
52	39 36	40 17	53.0	39 00	39 15	52.4	38 23	38 14	51.8	37 46	37 15	51.1	37 08	36 16	50.6	36 30	35 18	50.0	231
53	40 15	39 38	52.0	39 38	38 37	51.4	38 00	37 36	50.8	38 22	36 37	50.1	37 43	35 39	49.5	37 04	34 42	49.0	232
54	40 53	38 58	51.0	40 15	37 57	50.4	38 36	36 57	49.7	38 57	35 58	49.1	38 18	35 01	48.5	37 38	34 04	47.9	233
55	41 30	38 17	50.0	40 52	37 17	49.3	39 12	36 17	48.7	39 32	34 19	48.1	38 52	33 21	47.4	38 11	33 25	46.9	234
56	42 07	37 35	48.9	41 28	36 35	48.3	40 47	35 36	47.6	40 07	34 38	47.0	39 26	33 41	46.4	38 44	32 45	45.8	235
57	42 44	36 51	47.9	42 03	35 51	47.2	41 22	34 53	46.5	40 41	33 55	45.9	39 59	32 59	45.3	39 16	32 04	44.7	236
58	43 19	36 06	46.8	42 38	35 07	46.1	41 56	34 09	45.4	41 14	33 12	44.8	40 31	32 16	44.2	39 48	31 22	43.6	237
59	43 54	35 20	45.6	43 12	34 21	45.0	42 29	33 24	44.3	41 46	32 27	43.7	41 03	31 32	43.1	40 19	30 39	42.5	238
60	44 29	34 32	44.5	43 46	33 34	43.8	43 02	32 37	43.2	42 18	31 42	42.5	41 34	30 47	41.9	40 49	29 54	41.3	239
61	45 02	33 43	43.3	44 18	32 45	42.6	43 34	31 49	42.0	42 49	30 55	41.4	42 04	30 01	40.8	41 18	29 09	40.2	240
62	45 35	32 52	42.1	44 51	31 55	41.5	44 05	31 00	40.8	43 20	30 06	40.2	42 34	29 14	39.6	41 47	28 22	39.0	241
63	46 07	32 00	40.9	45 22	31 04	40.3	44 36	30 10	39.6	43 49	29 17	39.0	43 03	28 25	38.4	42 15	27 35	37.8	242
64	46 39	31 06	39.7	45 52	30 11	39.0	45 06	29 18	38.4	44 18	28 26	37.8	43 31	27 35	37.2	42 43	26 46	36.6	243
65	47 09	30 11	38.4	46 22	29 17	37.8	45 35	28 25	37.1	44 47	27 34	36.5	43 58	26 44	36.0	43 09	25 56	35.4	244
66	47 39	29 14	37.1	46 51	28 21	36.5	46 03	27 30	35.9	45 14	26 40	35.3	44 25	25 52	34.7	43 35	25 04	34.2	245
67	48 08	28 16	35.8	47 19	27 24	35.2	46 30	26 34	34.6	45 40	25 45	34.0	44 50	24 58	33.4	44 00	24 12	32.9	246
68	48 36	27 17	34.5	47 46	26 26	33.9	46 56	25 37	33.3	46 06	24 50	32.7	45 15	24 03	32.2	44 24	23 19	31.6	247
69	49 03	26 15	33.1	48 13	25 26	32.5	47 22	24 38	31.9	46 31	23 52	31.4	45 39	23 08	30.8	44 48	22 24	30.3	248
70	49 29	25 13	31.8	48 38	24 25	31.2	47 46	23 39	30.6	46 55	22 54	30.0	46 03	22 11	29.5	45 10	21 29	29.0	249
71	49 54	24 08	30.4	49 02	23 22	29.8	48 10	22 37	29.2	47 17	21 54	28.7	46 25	21 12	28.2	45 32	20 32	27.7	250
72	50 18	23 02	28.9	49 25	22 18	28.4	48 33	21 35	27.8	47 39	20 53	27.3	46 46	20 13	26.8	45 52	19 34	26.3	251
73	50 41	21 55	27.5	49 48	21 12	26.9	48 54	20 31	26.4	48 00	19 51	25.9	47 06	19 13	25.4	46 12	18 35	25.0	252
74	51 03	20 47	26.0	50 09	20 06	25.5	49 15	19 26	25.0	48 20	18 48	24.5	47 25	18 11	24.0	46 30	17 36	23.6	253
75	51 24	19 36	24.5	50 29	18 57	24.0	49 34	18 20	23.5	48 39	17 43	23.1	47 44	17 09	22.6	46 48	16 35	22.2	254
76	51 43	18 25	23.0	50 48	17 48	22.5	49 52	17 12	22.0	48 57	16 38	21.6	48 01	16 05	21.2	47 05	15 33	20.8	255
77	52 02	17 12	21.4	51 06	16 37	21.0	50 09	16 04	20.6	49 13	15 31	20.1	48 17	15 00	19.8	47 20	14 31	19.4	256
78	52 19	15 58	19.9	51 22	15 25	19.5	50 25	14 54	19.0	49 29	14 24	18.7	48 32	13 55	18.3	47 35	13 27	18.0	257
79	52 35	14 43	18.3	51 37	14 13	17.9	50 40	13 43	17.5	49 43	13 16	17.2	48 46	12 49	16.8	47 48	12 23	16.5	258
80	52 49	13 27	16.7	51 52	12 59	16.3	50 54	12 32	16.0	49 56	12 06	15.7	48 58	11 42	15.3	48 01	11 18	15.0	259
81	53 02	12 09	15.1	52 04	11 44	14.7	51 06	11 19	14.4	50 08	10 56	14.1	49 10	10 34	13.8	48 12	10 12	13.6	260
82	53 14	10 51	13.4	52 16	10 28	13.1	51 18	10 06	12.9	50 19	9 45	12.6	49 20	9 25	12.3	48 22	9 06	12.1	261
83	53 25	9 31	11.8	52 26	9 11	11.5	51 27	8 52	11.3	50 29	8 31	11.0	49 30	8 16	10.8	48 31	7 59	10.6	262
84	53 34	8 11	10.1	52 35	7 54	9.9	51 36	7 37	9.7	50 37	7 21	9.5	49 38	7 06	9.3	48 38	6 51	9.1	263
85	53 42	6 50	8.5	52 43	6 36	8.3	51 43	6 22	8.1	50 44	6 09	7.9	49 44	5 56	7.8	48 45	5 44	7.6	264
86	53 49	5 29	6.8	52 49	5 17	6.6	51 49	5 06	6.5	50 50	4 55	6.3	49 50	4 45	6.2	48 50	4 35	6.1	265
87	53 54	4 07	5.1	52 54	3 58	5.0	51 54	3 50	4.9	50 54	3 42	4.8	49 54	3 34	4.7	48 55	3 27	4.6	266
88	53 57	2 45	3.4	52 57	2 39	3.3	51 57	2 33	3.2	50 57	2 28	3.2	49 58	2 23	3.1	48 58	2 18	3.0	267
89	53 59	1 23	1.7	52 59	1 20	1.7	51 59	1 17	1.6	50 59	1 14	1.6	49 59	1 11	1.6	48 59	1 09	1.5	268
90	54 00	0 00	0.0	53 00	0 00	0.0	52 00	0 00	0.0	51 00	0 00	0.0	50 00	0 00	0.0	49 00	0 00	0.0	269

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

Z₁: same sign as B
Z₂: (-) for F > 90°

B: (-) for 90° < LHA < 270°
Dec: (-) for Lat. contrary name

Lat. / A		42°			43°			44°			45°			46°			47°			Lat. / A
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
0	180	0 00	48 00	90-0	0 00	47 00	90-0	0 00	46 00	90-0	0 00	45 00	90-0	0 00	44 00	90-0	0 00	43 00	90-0	180
1	179	0 45	48 00	89-3	0 44	47 00	89-3	0 43	46 00	89-3	0 42	45 00	89-3	0 41	44 00	89-3	0 40	43 00	89-3	181
2	178	1 29	47 59	88-7	1 28	46 59	88-6	1 26	45 59	88-6	1 25	44 59	88-6	1 23	43 59	88-6	1 22	42 59	88-5	182
3	177	2 14	47 58	88-0	2 12	46 58	88-0	2 09	45 58	87-9	2 07	44 58	87-9	2 05	43 58	87-8	2 03	42 58	87-8	183
4	176	2 58	47 56	87-3	2 55	46 56	87-3	2 53	45 56	87-2	2 50	44 56	87-2	2 47	43 56	87-1	2 44	42 56	87-1	184
5	175	3 43	47 53	86-6	3 39	46 53	86-6	3 36	45 53	86-5	3 32	44 53	86-5	3 28	43 53	86-4	3 24	42 53	86-3	185
6	174	4 27	47 51	86-0	4 23	46 51	85-9	4 19	45 51	85-8	4 14	44 51	85-7	4 10	43 51	85-7	4 05	42 51	85-6	186
7	173	5 12	47 47	85-3	5 07	46 47	85-1	5 02	45 47	85-0	4 57	44 47	85-0	4 51	43 47	85-0	4 46	42 47	84-9	187
8	172	5 56	47 43	84-6	5 51	46 43	84-5	5 45	45 43	84-4	5 39	44 43	84-3	5 33	43 43	84-2	5 27	42 43	84-1	188
9	171	6 41	47 39	84-0	6 34	46 39	83-8	6 28	45 39	83-7	6 21	44 39	83-6	6 14	43 39	83-5	6 07	42 39	83-4	189
10	170	7 25	47 34	83-3	7 18	46 34	83-1	7 11	45 34	83-0	7 03	44 34	82-9	6 56	43 34	82-8	6 48	42 34	82-7	190
11	169	8 09	47 28	82-6	8 01	46 28	82-4	7 53	45 28	82-3	7 45	44 28	82-2	7 37	43 28	82-0	7 29	42 28	81-9	191
12	168	8 53	47 22	81-9	8 45	46 22	81-8	8 36	45 22	81-6	8 27	44 22	81-5	8 18	43 22	81-3	8 09	42 22	81-2	192
13	167	9 37	47 16	81-2	9 28	46 15	81-1	9 19	45 15	80-9	9 09	44 15	80-7	8 59	43 15	80-6	8 49	42 16	80-4	193
14	166	10 21	47 08	80-5	10 11	46 08	80-3	10 01	45 08	80-2	9 51	44 08	80-0	9 40	43 08	79-8	9 30	42 08	79-7	194
15	165	11 05	47 01	79-8	10 55	46 00	79-6	10 44	45 00	79-5	10 33	44 00	79-3	10 21	43 00	79-1	10 10	42 01	78-9	195
16	164	11 49	46 52	79-1	11 38	45 52	78-9	11 26	44 52	78-7	11 14	43 52	78-5	11 02	42 52	78-3	10 50	41 52	78-2	196
17	163	12 33	46 43	78-4	12 21	45 43	78-2	12 08	44 43	78-0	11 56	43 43	77-8	11 43	42 43	77-6	11 30	41 44	77-4	197
18	162	13 17	46 34	77-7	13 04	45 34	77-5	12 51	44 34	77-3	12 37	43 34	77-1	12 24	42 34	76-8	12 10	41 34	76-6	198
19	161	14 00	46 24	77-0	13 46	45 24	76-8	13 33	44 24	76-5	13 19	43 24	76-3	13 04	42 24	76-1	12 50	41 24	75-9	199
20	160	14 43	46 13	76-3	14 29	45 13	76-1	14 15	44 13	75-8	14 00	43 13	75-6	13 45	42 13	75-3	13 29	41 14	75-1	200
21	159	15 27	46 02	75-6	15 12	45 02	75-3	14 56	44 02	75-1	14 41	43 02	74-8	14 25	42 02	74-6	14 09	41 03	74-3	201
22	158	16 10	45 50	74-9	15 54	44 50	74-6	15 38	43 50	74-3	15 22	42 50	74-1	15 05	41 50	73-8	14 48	40 51	73-5	202
23	157	16 53	45 38	74-1	16 36	44 38	73-9	16 19	43 38	73-6	16 02	42 38	73-3	15 45	41 38	73-0	15 27	40 39	72-8	203
24	156	17 36	45 25	73-4	17 18	44 25	73-1	17 01	43 25	72-8	16 43	42 25	72-5	16 25	41 25	72-2	16 06	40 26	72-0	204
25	155	18 18	45 11	72-7	18 00	44 11	72-4	17 42	43 11	72-1	17 23	42 11	71-8	17 04	41 12	71-5	16 45	40 12	71-2	205
26	154	19 01	44 57	71-9	18 42	43 57	71-6	18 23	42 57	71-3	18 03	41 57	71-0	17 44	40 57	70-7	17 24	39 58	70-4	206
27	153	19 43	44 42	71-2	19 24	43 42	70-8	19 04	42 42	70-5	18 43	41 42	70-2	18 23	40 43	69-9	18 02	39 43	69-6	207
28	152	20 25	44 26	70-4	20 05	43 26	70-1	19 44	42 26	69-7	19 23	41 27	69-4	19 02	40 27	68-8	18 40	39 28	68-5	208
29	151	21 07	44 10	69-6	20 46	43 10	69-3	20 25	42 10	68-9	20 03	41 10	68-6	19 41	40 11	68-3	19 18	39 12	67-9	209
30	150	21 49	43 53	68-9	21 27	42 53	68-5	21 05	41 53	68-1	20 42	40 54	67-8	20 19	39 54	67-4	19 56	38 55	67-1	210
31	149	22 30	43 35	68-1	22 08	42 35	67-7	21 45	41 36	67-3	21 21	40 36	67-0	20 58	39 37	66-6	20 34	38 38	66-3	211
32	148	23 11	43 17	67-3	22 48	42 17	66-9	22 24	41 17	66-5	22 00	40 18	66-2	21 36	39 19	65-8	21 11	38 20	65-4	212
33	147	23 53	42 58	66-5	23 28	41 58	66-1	23 04	40 58	65-7	22 39	39 59	65-3	22 14	39 00	65-0	21 48	38 02	64-6	213
34	146	24 33	42 38	65-7	24 08	41 38	65-3	23 43	40 39	64-9	23 17	39 40	64-5	22 51	38 41	64-1	22 25	37 42	63-7	214
35	145	25 14	42 18	64-9	24 48	41 18	64-5	24 22	40 18	64-1	23 56	39 19	63-7	23 29	38 21	63-3	23 02	37 23	62-9	215
36	144	25 54	41 56	64-1	25 28	40 57	63-6	25 01	39 57	63-2	24 34	38 58	62-8	24 06	38 00	62-4	23 38	37 02	62-0	216
37	143	26 34	41 34	63-2	26 07	40 35	62-8	25 39	39 35	62-4	25 11	38 37	61-9	24 43	37 38	61-5	24 14	36 41	61-1	217
38	142	27 14	41 11	62-4	26 46	40 12	61-9	26 17	39 13	61-5	25 48	38 14	61-1	25 19	37 16	60-7	24 50	36 19	60-3	218
39	141	27 53	40 48	61-5	27 24	39 48	61-1	26 55	38 50	60-6	26 25	37 51	60-2	25 55	36 53	59-8	25 25	35 56	59-4	219
40	140	28 32	40 23	60-7	28 02	39 24	60-2	27 32	38 25	59-8	26 31	36 30	58-9	26 00	35 30	58-5	26 00	35 30	58-1	220
41	139	29 11	39 58	59-8	28 40	38 59	59-3	28 10	38 01	58-9	27 02	37 03	58-4	26 31	36 05	58-0	26 35	35 08	57-6	221
42	138	29 49	39 32	58-9	29 18	38 33	58-4	28 46	37 35	58-0	28 14	36 37	57-5	27 42	35 40	57-1	27 09	34 43	56-6	222
43	137	30 27	39 05	58-0	29 55	38 06	57-5	29 23	37 08	57-1	28 50	36 11	56-6	28 17	34 57	56-2	27 43	34 18	56-1	223
44	136	31 05	38 37	57-1	30 32	37 39	56-6	29 59	36 41	56-1	29 25	35 44	55-7	28 51	34 47	55-2	28 17	33 51	54-8	224
45	135	31 42	38 09	56-2	31 08	37 10	55-7	30 34	36 13	55-2	30 00	35 16	54-7	29 25	34 20	54-3	28 50	33 24	53-8	225

Lat. / A	42°			43°			44°			45°			46°			47°			Lat. / A
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45 135	31 42	38 09	56:2	31 08	37 10	55:7	30 34	36 13	55:2	30 00	35 16	54:7	29 25	34 20	54:3	28 50	33 24	53:8	225 315
46 134	32 19	37 39	55:3	31 45	36 41	54:8	31 10	35 44	54:3	30 34	34 47	53:8	29 59	33 51	53:3	29 23	32 56	52:9	226 314
47 133	32 55	37 08	54:3	32 20	36 11	53:8	31 45	35 14	53:3	31 08	34 18	52:8	30 32	33 22	52:4	29 55	32 27	51:9	227 313
48 132	33 31	36 37	53:4	32 55	35 40	52:9	32 19	34 43	52:3	31 42	33 47	51:9	31 05	32 52	51:4	30 27	31 58	50:9	228 312
49 131	34 07	36 05	52:4	33 30	35 08	51:9	32 53	34 11	51:4	32 15	33 16	50:9	31 37	32 21	50:4	30 59	31 27	49:9	229 311
50 130	34 42	35 31	51:4	34 04	34 35	50:9	33 26	33 39	50:4	32 48	32 44	49:9	32 09	31 50	49:4	31 30	30 56	48:9	230 310
51 129	35 17	34 57	50:4	34 38	34 01	49:9	33 59	33 05	49:4	33 20	32 11	48:9	32 40	31 17	48:4	32 00	30 24	47:9	231 309
52 128	35 51	34 22	49:4	35 12	33 26	48:9	34 32	32 31	48:4	33 52	31 37	47:9	33 11	30 44	47:4	32 30	29 52	46:9	232 308
53 127	36 24	33 45	48:4	35 44	32 50	47:9	35 04	31 56	47:3	34 23	30 12	46:8	33 42	29 10	46:3	33 09	29 18	45:9	233 307
54 126	36 57	33 08	47:4	36 17	32 13	46:8	35 35	31 20	46:3	34 54	30 27	45:8	34 12	29 35	45:3	33 29	28 44	44:8	234 306
55 125	37 30	32 30	46:3	36 48	31 36	45:8	36 06	30 43	45:2	35 24	29 50	44:7	34 41	28 59	44:2	33 58	28 08	43:8	235 305
56 124	38 02	31 51	45:2	37 19	30 57	44:7	36 37	30 04	44:2	35 53	29 13	43:6	35 10	28 22	43:2	34 26	27 32	42:7	236 304
57 123	38 33	31 10	44:1	37 50	30 17	43:6	37 06	29 25	43:1	36 22	28 34	42:6	35 38	27 45	42:1	34 53	26 56	41:6	237 303
58 122	39 04	30 29	43:0	38 20	29 36	42:5	37 36	28 45	42:0	36 51	27 55	41:5	36 06	27 06	41:0	35 20	26 18	40:5	238 302
59 121	39 34	29 46	41:9	38 49	28 55	41:4	38 04	28 04	40:9	37 19	27 15	40:4	36 33	26 27	39:9	35 46	25 39	39:4	239 301
60 120	40 04	29 03	40:8	39 18	28 12	40:2	38 32	27 22	39:7	37 46	26 34	39:2	36 59	25 46	38:8	36 12	25 00	38:3	240 300
61 119	40 32	28 18	39:6	39 46	27 28	39:1	38 59	26 39	38:6	38 12	25 52	38:1	37 25	25 05	37:6	36 37	24 20	37:2	241 299
62 118	41 00	27 32	38:5	40 13	26 43	37:9	39 26	25 56	37:4	38 38	25 09	36:9	37 50	24 23	36:5	37 02	23 39	36:0	242 298
63 117	41 28	26 45	37:3	40 40	25 58	36:8	39 52	25 11	36:3	39 03	24 25	35:8	38 14	23 40	35:3	37 25	22 57	34:9	243 297
64 116	41 54	25 58	36:1	41 06	25 11	35:6	40 17	24 25	35:1	39 28	23 40	34:6	38 38	22 57	34:1	37 48	22 14	33:7	244 296
65 115	42 20	25 09	34:9	41 31	24 23	34:4	40 41	23 38	33:9	39 51	22 55	33:4	39 01	22 12	33:0	38 11	21 31	32:5	245 295
66 114	42 45	24 19	33:6	41 55	23 34	33:1	41 05	22 50	32:7	40 14	22 08	32:2	39 23	21 27	31:8	38 32	20 46	31:3	246 294
67 113	43 10	23 28	32:4	42 19	22 44	31:9	41 28	22 02	31:4	40 37	21 21	31:0	39 45	20 40	30:5	38 53	20 01	30:1	247 293
68 112	43 33	22 35	31:1	42 42	21 53	30:6	41 50	20 12	30:2	40 58	20 32	29:7	40 06	19 53	29:3	39 13	19 15	28:9	248 292
69 111	43 56	21 42	29:8	43 04	21 01	29:4	42 11	20 22	28:9	41 19	19 43	28:5	40 26	19 05	28:1	39 33	18 29	27:7	249 291
70 110	44 18	20 48	28:5	43 25	20 08	28:1	42 32	19 30	27:7	41 38	18 53	27:2	40 45	18 17	26:8	39 51	17 41	26:5	250 290
71 109	44 38	19 53	27:2	43 45	19 15	26:8	42 51	18 38	26:4	41 57	18 02	26:0	41 03	17 27	25:6	40 09	16 53	25:2	251 289
72 108	44 58	18 57	25:9	44 04	18 20	25:5	43 10	17 45	25:1	42 16	17 10	24:7	41 21	16 37	24:3	40 26	16 05	24:0	252 288
73 107	45 17	17 59	24:6	44 23	17 24	24:1	43 28	16 51	23:8	42 33	16 18	23:4	41 38	15 46	23:0	40 42	15 15	22:7	253 287
74 106	45 35	17 01	23:2	44 40	16 28	22:8	43 45	15 56	22:4	42 49	15 25	22:1	41 54	14 54	21:7	40 58	14 25	21:4	254 286
75 105	45 53	16 02	21:8	44 57	15 31	21:4	44 01	15 00	21:1	43 05	14 31	20:8	42 09	14 02	20:4	41 12	13 34	20:1	255 285
76 104	46 09	15 02	20:4	45 12	14 33	20:1	44 16	14 04	19:7	43 19	13 36	19:4	42 23	13 09	19:1	41 26	12 43	18:8	256 284
77 103	46 24	14 02	19:0	45 27	13 34	18:7	44 30	13 07	18:4	43 33	12 41	18:1	42 36	12 15	17:8	41 39	11 51	17:5	257 283
78 102	46 38	13 00	17:6	45 40	12 34	17:3	44 43	12 09	17:0	43 46	11 45	16:7	42 48	11 21	16:5	41 51	10 58	16:2	258 282
79 101	46 51	11 58	16:2	45 53	11 34	15:9	44 55	11 11	15:6	43 57	10 48	15:4	43 00	10 26	15:1	42 02	10 05	14:9	259 281
80 100	47 03	10 55	14:8	46 04	10 33	14:5	45 06	10 12	14:2	44 08	9 51	14:0	43 10	9 31	13:8	42 12	9 12	13:6	260 280
81 99	47 13	9 51	13:3	46 15	9 31	13:1	45 16	9 12	12:8	44 18	8 53	12:6	43 19	8 35	12:4	42 21	8 18	12:2	261 279
82 98	47 23	8 47	11:9	46 24	8 29	11:6	45 26	8 12	11:4	44 27	7 55	11:2	43 28	7 39	11:1	42 29	7 24	10:9	262 278
83 97	47 32	7 42	10:4	46 33	7 27	10:2	45 34	7 12	10:0	44 34	6 57	9:9	43 35	6 43	9:7	42 36	6 29	9:5	263 277
84 96	47 39	6 37	8:9	46 40	6 24	8:8	45 41	6 11	8:6	44 41	5 58	8:5	43 42	5 46	8:3	42 42	5 34	8:2	264 276
85 95	47 46	5 32	7:4	46 46	5 20	7:3	45 46	5 09	7:2	44 47	4 59	7:1	43 47	4 49	6:9	42 48	4 39	6:8	265 275
86 94	47 51	4 26	6:0	46 51	4 17	5:9	45 51	4 08	5:7	44 52	3 59	5:6	43 52	3 51	5:6	42 52	3 43	5:5	266 274
87 93	47 55	3 20	4:5	46 55	3 13	4:4	45 55	3 06	4:3	44 55	3 00	4:2	43 55	2 54	4:2	42 56	2 48	4:1	267 273
88 92	47 58	2 13	3:0	46 58	2 09	2:9	45 58	2 04	2:9	44 58	2 00	2:8	43 58	1 56	2:8	42 58	1 52	2:7	268 272
89 91	47 59	1 07	1:5	46 59	1 04	1:5	45 59	1 02	1:4	44 59	1 00	1:4	43 59	0 58	1:4	43 00	0 56	1:4	269 271
90 90	48 00	0 00	0:0	47 00	0 00	0:0	46 00	0 00	0:0	45 00	0 00	0:0	44 00	0 00	0:0	43 00	0 00	0:0	270 270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

SIGHT REDUCTION TABLE										Z ₁ : same sign as B Z ₂ : (—) for F > 90°																
48°					50°					51°					52°					53°					Lat. / A	
LHA/F	A/H	B/P	Z ₁ /Z ₂		A/H	B/P	Z ₁ /Z ₂		A/H	B/P	Z ₁ /Z ₂		A/H	B/P	Z ₁ /Z ₂		A/H	B/P	Z ₁ /Z ₂		A/H	B/P	Z ₁ /Z ₂		LHA	
0 180	0 00	42 00	90-0	0 00	0 00	40 00	90-0	0 00	0 00	39 00	90-0	0 00	0 00	38 00	90-0	0 00	0 00	37 00	90-0	0 00	36 54	86-0	185	355	360	
1 179	0 40	42 00	89-3	0 39	0 39	40 00	89-2	0 38	0 38	39 00	89-2	0 37	0 37	38 00	89-2	0 36	0 36	37 00	89-2	0 35	36 54	85-2	186	354	359	
2 178	1 20	41 59	88-5	1 19	1 19	39 59	88-5	1 18	1 18	38 59	88-4	1 17	1 17	37 59	88-4	1 16	1 16	36 59	88-4	1 15	36 54	84-6	187	353	358	
3 177	2 00	41 58	87-8	1 58	1 58	39 58	87-7	1 56	1 56	38 58	87-7	1 55	1 55	37 58	87-6	1 54	1 54	36 58	87-6	1 53	36 54	83-8	188	352	357	
4 176	2 41	41 56	87-0	2 37	2 37	40 56	87-0	2 34	2 34	39 56	86-9	2 31	2 31	37 56	86-8	2 28	2 28	36 56	86-8	2 24	36 54	81-2	189	351	356	
5 175	3 21	41 53	86-3	3 17	3 17	40 54	86-2	3 13	3 13	39 54	86-2	3 09	3 09	38 54	86-1	3 05	3 05	36 54	86-0	3 00	36 54	80-4	190	350	355	
6 174	4 01	41 51	85-5	3 56	3 56	40 51	85-5	3 51	3 51	39 51	85-4	3 46	3 46	38 51	85-3	3 41	3 41	36 51	85-2	3 36	36 54	79-6	191	349	354	
7 173	4 41	41 47	84-8	4 35	4 35	40 47	84-8	4 30	4 30	39 47	84-6	4 24	4 24	38 47	84-5	4 18	4 18	36 48	84-4	4 12	36 51	78-8	192	348	353	
8 172	5 21	41 43	84-0	5 14	5 14	40 43	83-9	5 08	5 08	39 43	83-9	5 01	5 01	38 44	83-8	4 55	4 55	36 44	83-6	4 48	36 48	78-0	193	347	352	
9 171	6 01	41 39	83-3	5 53	5 53	40 39	83-2	5 46	5 46	39 39	83-1	5 39	5 39	37 44	83-0	5 32	5 32	36 40	82-8	5 24	36 40	77-2	194	346	351	
10 170	6 40	41 34	82-5	6 32	6 32	40 34	82-4	6 25	6 25	39 34	82-3	6 16	6 16	38 34	82-2	6 08	6 08	36 35	82-0	6 00	36 35	76-4	195	345	350	
11 169	7 20	41 28	81-8	7 11	7 11	40 28	81-7	7 03	7 03	39 29	81-5	6 54	6 54	38 29	81-4	6 45	6 45	36 29	81-2	6 36	36 29	75-6	196	344	349	
12 168	8 00	41 22	81-0	7 50	7 50	40 22	80-9	7 41	7 41	39 23	80-8	7 31	7 31	38 23	80-6	7 21	7 21	36 24	80-4	7 11	36 24	74-8	197	343	348	
13 167	8 39	41 16	80-3	8 29	8 29	40 16	80-1	8 19	8 19	39 16	80-0	8 08	8 08	37 16	79-8	7 58	7 58	36 17	79-6	7 47	36 17	74-0	198	342	347	
14 166	9 19	41 09	79-5	9 08	9 08	40 09	79-3	8 57	8 57	39 09	79-2	8 45	8 45	38 09	79-0	8 34	8 34	36 10	78-7	8 22	36 10	73-2	199	341	346	
15 165	9 58	41 01	78-7	9 47	9 47	40 01	78-6	9 35	9 35	39 02	78-4	9 22	9 22	38 02	78-2	9 10	9 10	35 03	77-9	8 58	36 03	72-4	200	340	345	
16 164	10 38	40 53	78-0	10 25	10 25	39 53	77-8	10 12	10 12	38 53	77-6	10 00	10 00	37 02	77-4	9 46	9 46	35 55	77-1	9 33	35 55	72-6	201	339	344	
17 163	11 17	40 44	77-2	11 04	11 04	39 44	77-0	10 50	10 50	38 45	76-8	10 36	10 36	37 45	76-6	10 22	10 22	35 47	76-3	10 08	35 47	72-8	202	338	343	
18 162	11 56	40 34	76-4	11 42	11 42	39 35	76-2	11 27	11 27	38 35	76-0	11 13	11 13	37 36	75-8	10 58	10 58	35 38	75-5	10 43	35 38	72-0	203	337	342	
19 161	12 35	40 25	75-6	12 20	12 20	39 25	75-4	12 05	12 05	38 26	75-2	11 49	11 49	37 26	75-0	11 34	11 34	35 28	74-6	11 18	35 28	72-2	204	336	341	
20 160	13 14	40 14	74-9	12 58	12 58	39 15	74-6	12 42	12 42	38 15	74-4	12 26	12 26	37 16	74-2	12 09	12 09	35 18	73-8	11 53	35 18	72-4	205	335	340	
21 159	13 52	40 03	74-1	13 36	13 36	39 04	73-8	13 19	13 19	38 04	73-6	13 02	13 02	37 05	73-4	12 45	12 45	35 06	73-2	12 27	35 06	72-6	206	334	339	
22 158	14 31	39 51	73-3	14 14	14 14	38 52	73-0	13 56	13 56	37 53	72-8	13 38	13 38	36 54	72-6	13 20	13 20	34 56	72-1	13 02	34 56	72-3	207	333	338	
23 157	15 09	39 39	72-5	14 51	14 51	38 40	72-2	14 33	14 33	37 41	72-0	14 14	14 14	36 42	71-7	13 55	13 55	34 45	71-3	13 36	34 45	72-5	208	332	337	
24 156	15 48	39 26	71-7	15 29	15 29	38 27	71-4	15 09	15 09	37 28	71-2	14 50	14 50	36 30	70-9	14 30	14 30	34 33	70-4	14 10	34 33	72-7	209	331	336	
25 155	16 26	39 13	70-9	16 06	16 06	38 14	70-6	15 46	15 46	37 15	70-3	15 25	15 25	36 17	70-1	15 05	15 05	34 20	69-6	14 44	34 20	72-9	210	330	335	
26 154	17 03	38 59	70-1	16 43	16 43	38 00	69-8	16 22	16 22	37 01	69-5	16 01	16 01	36 03	69-2	15 39	15 39	33 53	68-7	15 18	34 07	73-1	211	329	334	
27 153	17 41	38 44	69-3	17 20	17 20	37 46	69-0	16 58	16 58	36 47	68-7	16 36	16 36	35 49	68-4	16 14	16 14	33 53	67-9	15 51	33 53	73-3	212	328	333	
28 152	18 19	38 29	68-4	17 56	17 56	37 30	68-1	17 34	17 34	36 32	67-8	17 11	17 11	35 34	67-5	16 48	16 48	33 38	67-0	16 25	33 38	73-5	213	327	332	
29 151	18 56	38 13	67-6	18 33	18 33	37 15	67-3	18 09	18 09	36 16	67-0	17 46	17 46	35 18	66-7	17 22	17 22	33 23	66-1	16 58	33 23	73-7	214	326	331	
30 150	19 33	37 57	66-8	19 09	19 09	36 58	66-5	18 45	18 45	36 00	66-1	18 20	18 20	35 03	65-8	17 56	17 56	33 08	65-2	17 31	33 08	73-9	215	325	330	
31 149	20 10	37 40	65-9	19 45	19 45	36 41	65-6	19 20	19 20	35 44	65-3	18 55	18 55	34 46	65-0	18 29	18 29	32 52	64-4	18 03	32 52	74-1	216	324	329	
32 148	20 46	37 22	65-1	20 21	20 21	36 24	64-8	19 55	19 55	35 26	64-4	19 29	19 29	34 29	64-1	19 02	19 02	32 35	63-5	18 36	32 35	74-3	217	323	328	
33 147	21 22	37 03	64-2	21 31	21 31	36 06	63-9	20 30	20 30	35 08	63-6	20 03	20 03	34 11	63-2	19 35	19 35	32 18	62-6	19 08	32 18	74-5	218	322	327	
34 146	21 58	36 44	63-4	21 58	21 58	35 47	63-0	21 04	21 04	34 49	62-7	20 36	20 36	33 53	62-3	20 08	20 08	32 00	61-7	19 40	32 00	74-7	219	321	326	
35 145	22 34	36 25	62-5	22 34	22 34	35 27	62-1	21 38	21 38	34 30	61-8	21 10	21 10	33 33	61-4	20 41	20 41	31 41	60-8	20 12	31 41	74-9	220	320	325	
36 144	23 10	36 04	61-6	22 41	22 41	35 07	61-3	22 12	22 12	34 10	60-9	21 43	21 43	33 14	60-5	21 13	21 13	31 22	59-9	20 43	31 22	75-1	221	319	324	
37 143	23 45	35 43	60-8	23 15	23 15	34 46	60-4	22 45	22 45	33 50	60-0	22 15	22 15	32 53	59-6	21 45	21 45	31 02	59-0	21 14	31 02	75-3	222	318	323	
38 142	24 20	35 21	59-9	23 49	23 49	34 25	59-5	23 19	23 19	33 28	59-1	22 48	22 48	32 33	58-7	22 16	22 16	30 21	58-0	21 45	30 21	75-5	223	317	322	
39 141	24 54	34 59	59-0	24 23	24 23	34 02	58-6	23 52	23 52	33 07	58-2	23 20	23 20	32 11	57-8	22 48	22 48	29 38	56-2	22 45	29 38	75-7	224	316	321	
40 140	25 28	34 36	58-1	24 57	24 57	33 40	57-7	24 24	24 24	32 44	57-3	23 52	23 52	31 49	56-9	23 19	23 19	28 03	55-2	22 45	28 03	75-9	225	315	320	
41 139	26 02	34 12	57-1	25 30	25 30	33 16	56-7																			

Lat. / A		48°			49°			50°			51°			52°			53°			Lat. / A
LHA/F		A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	135	28 14	32 29	53.4	27 38	31 35	53.0	27 32	30 41	52.5	26 25	29 48	52.1	25 48	28 55	51.8	25 11	28 03	51.4	225
46	134	28 46	32 01	52.4	28 10	31 08	52.0	27 32	30 14	51.6	26 55	29 22	51.2	25 48	28 55	51.8	25 11	28 03	51.4	226
47	133	29 18	31 33	51.4	28 40	30 40	51.0	28 02	29 47	50.6	27 32	28 55	50.2	26 46	28 03	50.8	26 07	27 38	50.4	227
48	132	29 49	31 04	50.5	29 11	30 11	50.0	28 32	29 19	49.6	27 53	28 27	49.2	27 14	27 36	48.8	26 34	26 46	48.4	228
49	131	30 20	30 34	49.5	29 41	29 42	49.0	29 01	28 50	48.6	28 21	27 59	48.2	27 41	27 08	47.8	27 01	26 18	47.4	229
50	130	30 50	30 04	48.5	30 10	29 12	48.0	29 30	28 20	47.6	28 49	27 30	47.2	28 08	26 40	46.8	27 27	25 51	46.4	230
51	129	31 20	29 32	47.5	30 39	28 41	47.0	29 58	27 50	46.6	29 17	27 00	46.2	28 35	26 11	45.8	27 53	25 22	45.4	231
52	128	31 49	29 00	46.4	31 08	28 09	46.0	30 26	27 19	45.6	29 44	26 30	45.2	29 01	25 41	44.8	28 19	24 53	44.4	232
53	127	32 18	28 27	45.4	31 36	27 37	45.0	30 53	26 48	44.5	30 10	25 59	44.1	29 27	25 11	43.7	28 44	24 24	43.3	233
54	126	32 46	27 53	44.4	32 03	27 04	43.9	31 20	26 15	43.5	30 36	25 30	43.1	29 52	24 40	42.7	29 08	23 53	42.3	234
55	125	33 14	27 19	43.3	32 30	26 30	42.9	31 46	25 42	42.4	31 02	24 55	42.0	30 17	24 08	41.6	29 32	23 23	41.2	235
56	124	33 42	26 44	42.2	32 57	25 55	41.8	32 12	25 08	41.4	31 27	24 22	41.0	30 41	23 36	40.6	29 56	22 51	40.2	236
57	123	34 08	26 07	41.1	33 23	25 20	40.7	32 37	24 34	40.3	31 51	23 48	39.9	31 05	23 03	39.5	30 19	22 19	39.1	237
58	122	34 34	25 30	40.1	33 48	24 44	39.6	33 02	23 58	39.2	32 15	23 14	38.8	31 28	22 29	38.4	30 41	21 46	38.0	238
59	121	35 00	24 53	39.0	34 13	24 07	38.5	33 26	23 22	38.1	32 39	22 38	37.7	31 51	21 55	37.3	31 03	21 13	37.0	239
60	120	35 25	24 14	37.8	34 37	23 30	37.4	33 50	22 46	37.0	33 02	22 03	36.6	32 13	21 20	36.2	31 25	20 39	35.9	240
61	119	35 49	23 35	36.7	35 01	22 51	36.3	34 12	22 08	35.9	33 24	21 26	35.5	32 35	20 45	35.1	31 46	20 04	34.8	241
62	118	36 13	22 55	35.6	35 24	22 12	35.2	34 35	21 30	34.8	33 45	20 49	34.4	32 56	20 09	34.0	32 06	19 29	33.7	242
63	117	36 36	22 14	34.4	35 46	21 32	34.0	34 56	20 51	33.6	34 06	20 11	33.3	33 16	19 32	32.9	32 26	18 53	32.5	243
64	116	36 58	21 32	33.3	36 08	20 52	32.9	35 17	20 12	32.5	34 27	19 33	32.1	33 36	18 54	31.8	32 45	18 17	31.4	244
65	115	37 20	20 50	32.1	36 29	20 10	31.7	35 38	19 32	31.3	34 47	18 54	31.0	33 55	18 16	30.6	33 03	17 40	30.3	245
66	114	37 41	20 07	30.9	36 49	19 28	30.5	35 58	18 51	30.2	35 06	18 14	29.8	34 13	17 38	29.5	33 21	17 02	29.1	246
67	113	38 01	19 23	29.7	37 09	18 46	29.4	36 17	18 09	29.0	35 24	17 33	28.6	34 31	16 59	28.3	33 38	16 24	28.0	247
68	112	38 21	18 38	28.5	37 28	18 02	28.2	36 35	17 27	27.8	35 42	16 53	27.5	34 48	16 19	27.1	33 55	15 46	26.8	248
69	111	38 40	17 53	27.3	37 46	17 18	27.0	36 53	16 44	26.6	35 59	16 11	26.3	35 05	15 38	26.0	34 11	15 07	25.7	249
70	110	38 58	17 07	26.1	38 04	16 33	25.7	37 10	16 01	25.4	36 15	15 29	25.1	35 21	14 58	24.8	34 26	14 27	24.5	250
71	109	39 15	16 20	24.9	38 20	15 48	24.5	37 26	15 17	24.2	36 31	14 46	23.9	35 36	14 16	23.6	34 41	13 47	23.3	251
72	108	39 31	15 33	23.6	38 36	15 02	23.3	37 41	14 32	23.0	36 46	14 03	22.7	35 50	13 34	22.4	34 55	13 07	22.1	252
73	107	39 47	14 45	22.4	38 51	14 16	22.1	37 56	13 47	21.8	37 00	13 19	21.5	36 04	12 52	21.2	35 08	12 25	20.9	253
74	106	40 02	13 56	21.1	39 06	13 28	20.8	38 10	13 01	20.5	37 13	12 35	20.3	36 17	12 09	20.0	35 21	11 44	19.8	254
75	105	40 16	13 07	19.8	39 19	12 41	19.5	38 23	12 15	19.3	37 26	11 50	19.0	36 29	11 26	18.8	35 33	11 02	18.5	255
76	104	40 29	12 17	18.5	39 32	11 53	18.3	38 35	11 28	18.0	37 38	11 05	17.8	36 41	10 42	17.6	35 44	10 20	17.3	256
77	103	40 41	11 27	17.3	39 44	11 04	17.0	38 47	10 41	16.8	37 49	10 19	16.5	36 52	9 58	16.3	35 54	9 37	16.1	257
78	102	40 53	10 36	16.0	39 55	10 15	15.7	38 57	9 54	15.5	38 00	9 33	15.3	37 02	9 14	15.1	36 04	8 54	14.9	258
79	101	41 04	9 45	14.7	40 05	9 25	14.4	39 07	9 06	14.2	38 09	8 47	14.0	37 11	8 29	13.9	36 13	8 11	13.7	259
80	100	41 13	8 53	13.3	40 15	8 35	13.2	39 16	8 17	13.0	38 18	8 00	12.8	37 19	7 44	12.6	36 21	7 27	12.5	260
81	99	41 22	8 01	12.0	40 23	7 45	11.9	39 25	7 29	11.7	38 26	7 13	11.5	37 27	6 58	11.4	36 28	6 43	11.2	261
82	98	41 30	7 09	10.7	40 31	6 54	10.5	39 32	6 40	10.4	38 33	6 26	10.3	37 34	6 12	10.1	36 35	5 59	10.0	262
83	97	41 37	6 16	9.4	40 38	6 03	9.2	39 39	5 50	9.1	38 39	5 38	9.0	37 40	5 26	8.9	36 41	5 15	8.7	263
84	96	41 43	5 23	8.1	40 44	5 12	7.9	39 44	5 01	7.8	38 45	4 50	7.7	37 45	4 40	7.6	36 46	4 30	7.5	264
85	95	41 48	4 29	6.7	40 49	4 20	6.6	39 49	4 11	6.5	38 49	4 02	6.4	37 50	3 54	6.3	36 50	3 45	6.3	265
86	94	41 52	3 36	5.4	40 53	3 28	5.3	39 53	3 21	5.2	38 53	3 14	5.1	37 53	3 07	5.1	36 54	3 01	5.0	266
87	93	41 56	2 42	4.0	40 56	2 36	4.0	39 56	2 31	3.9	38 56	2 26	3.9	37 56	2 20	3.8	36 56	2 16	3.8	267
88	92	41 58	1 48	2.7	40 58	1 44	2.6	39 58	1 41	2.6	38 58	1 37	2.6	37 58	1 34	2.5	36 58	1 30	2.5	268
89	91	42 00	0 54	1.3	41 00	0 52	1.3	40 00	0 50	1.3	39 00	0 49	1.3	38 00	0 47	1.3	37 00	0 45	1.3	269
90	90	42 00	0 00	0.0	41 00	0 00	0.0	40 00	0 00	0.0	39 00	0 00	0.0	38 00	0 00	0.0	37 00	0 00	0.0	270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

SIGHT REDUCTION TABLE										Z ₁ : same sign as B Z ₂ : (-) for F > 90°											
Lat. / A		54°			55°			56°			57°			58°			59°			Lat. / A	
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA		
0 180	0 00	36 00	90-0	0 00	35 00	90-0	0 00	34 00	90-0	0 00	33 00	90-0	0 00	32 00	90-0	0 00	31 00	90-0	180 360		
1 179	0 35	36 00	89-2	0 34	35 00	89-2	0 34	34 00	89-2	0 33	33 00	89-2	0 32	32 00	89-2	0 31	31 00	89-1	181 359		
2 178	1 11	35 59	88-4	1 09	34 59	88-4	1 07	33 59	88-3	1 05	32 59	88-3	1 04	31 59	88-3	1 02	30 59	88-3	182 358		
3 177	1 46	35 58	87-6	1 43	34 58	87-5	1 41	33 58	87-5	1 38	32 58	87-5	1 35	31 58	87-5	1 33	30 58	87-4	183 357		
4 176	2 21	35 56	86-8	2 18	34 56	86-7	2 14	33 56	86-7	2 11	32 56	86-6	2 07	31 56	86-6	2 04	30 56	86-6	184 356		
5 175	2 56	35 54	86-0	2 52	34 54	85-9	2 48	33 54	85-9	2 43	32 54	85-8	2 39	31 54	85-8	2 34	30 54	85-7	185 355		
6 174	3 31	35 51	85-1	3 26	34 51	85-1	3 21	33 51	85-0	3 16	32 51	85-0	3 11	31 52	84-9	3 05	30 52	84-9	186 354		
7 173	4 06	35 48	84-3	4 00	34 48	84-3	3 54	33 48	84-2	3 48	32 48	84-1	3 41	31 48	84-1	3 36	30 49	84-0	187 353		
8 172	4 42	35 44	83-5	4 35	34 44	83-4	4 28	33 44	83-4	4 21	32 45	83-3	4 14	31 45	83-2	4 07	30 45	83-1	188 352		
9 171	5 17	35 40	82-7	5 09	34 40	82-6	5 01	33 40	82-5	4 53	32 41	82-4	4 45	31 41	82-3	4 37	30 41	82-3	189 351		
10 170	5 51	35 35	81-9	5 43	34 35	81-8	5 34	33 36	81-7	5 26	32 36	81-6	5 17	31 36	81-5	5 08	30 37	81-4	190 350		
11 169	6 26	35 30	81-1	6 17	34 30	81-0	6 08	33 31	80-8	5 58	32 31	80-7	5 48	31 31	80-6	5 38	30 32	80-5	191 349		
12 168	7 01	35 24	80-2	6 51	34 24	80-1	6 41	33 25	80-0	6 30	32 25	79-9	6 20	31 26	79-8	6 09	30 27	79-7	192 348		
13 167	7 36	35 18	79-4	7 25	34 18	79-3	7 14	33 19	79-2	7 02	32 19	79-0	6 51	31 20	78-9	6 39	30 21	78-8	193 347		
14 166	8 11	35 11	78-6	7 59	34 12	78-5	7 46	33 12	78-3	7 34	32 13	78-2	7 22	31 14	78-1	7 09	30 15	77-9	194 346		
15 165	8 45	35 04	77-8	8 32	34 04	77-6	8 19	33 05	77-5	8 06	32 06	77-3	7 53	31 07	77-2	7 40	30 08	77-1	195 345		
16 164	9 19	34 56	76-9	9 06	33 57	76-8	8 52	32 58	76-6	8 38	31 58	76-5	8 24	31 00	76-3	8 10	30 01	76-2	196 344		
17 163	9 54	34 47	76-1	9 39	33 48	75-9	9 25	32 49	75-8	9 10	31 50	75-6	8 55	30 52	75-5	8 40	29 53	75-3	197 343		
18 162	10 28	34 39	75-3	10 13	33 40	75-1	9 57	32 41	74-9	9 41	31 42	74-8	9 25	30 43	74-6	9 09	29 45	74-4	198 342		
19 161	11 02	34 29	74-4	10 46	33 30	74-2	10 29	32 32	74-1	10 13	31 33	73-9	9 56	30 35	73-7	9 39	29 36	73-6	199 341		
20 160	11 36	34 19	73-6	11 19	33 21	73-4	11 02	32 22	73-2	10 44	31 24	73-0	10 27	30 25	72-8	10 09	29 27	72-7	200 340		
21 159	12 10	34 09	72-7	11 52	33 10	72-5	11 34	32 12	72-3	11 15	31 14	72-2	10 57	30 15	72-0	10 38	29 17	71-8	201 339		
22 158	12 43	33 58	71-9	12 24	33 00	71-7	12 06	32 01	71-5	11 46	31 03	71-3	11 27	30 05	71-1	11 07	29 07	70-9	202 338		
23 157	13 17	33 46	71-0	12 57	32 48	70-8	12 37	31 50	70-6	12 17	30 52	70-4	11 57	29 54	70-2	11 37	28 57	70-0	203 337		
24 156	13 50	33 34	70-2	13 29	32 36	70-0	13 09	31 38	69-7	12 48	30 41	69-5	12 27	29 43	69-3	12 06	28 46	69-1	204 336		
25 155	14 23	33 22	69-3	14 02	32 24	69-1	13 40	31 26	68-9	13 18	30 29	68-6	12 56	29 31	68-4	12 34	28 34	68-2	205 335		
26 154	14 56	33 09	68-5	14 34	32 11	68-2	14 11	31 14	68-0	13 49	30 16	67-8	13 26	29 19	67-5	13 03	28 22	67-3	206 334		
27 153	15 29	32 55	67-6	15 06	31 58	67-3	14 42	31 00	67-1	14 19	30 03	66-9	13 55	29 06	66-6	13 31	28 10	66-4	207 333		
28 152	16 01	32 41	66-7	15 37	31 44	66-5	15 13	30 47	66-2	14 49	29 50	66-0	14 24	28 53	65-7	14 00	27 57	65-5	208 332		
29 151	16 33	32 26	65-8	16 09	31 29	65-6	15 44	30 32	65-3	15 19	29 36	65-1	14 53	28 39	64-8	14 28	27 43	64-6	209 331		
30 150	17 05	32 11	65-0	16 40	31 14	64-7	16 14	30 17	64-4	15 48	29 21	64-2	15 22	28 25	63-9	14 55	27 29	63-7	210 330		
31 149	17 37	31 55	64-1	17 11	30 58	63-8	16 44	29 42	63-5	16 17	29 06	63-3	15 50	28 10	63-0	15 23	27 15	62-7	211 329		
32 148	18 09	31 38	63-2	17 42	30 42	62-9	17 14	29 06	62-6	16 47	28 51	62-3	16 19	27 55	62-1	15 50	27 00	61-8	212 328		
33 147	18 40	31 21	62-3	18 12	30 25	62-0	17 44	29 30	61-7	17 15	28 34	61-4	16 47	27 39	61-2	16 17	26 45	60-9	213 327		
34 146	19 11	31 04	61-4	18 42	30 08	61-1	18 13	29 13	60-8	17 44	28 18	60-5	17 14	27 23	60-2	16 44	26 29	60-0	214 326		
35 145	19 42	30 46	60-5	19 12	29 50	60-2	18 42	28 55	59-9	18 12	28 01	59-6	17 42	27 06	59-3	17 11	26 12	59-0	215 325		
36 144	20 13	30 27	59-6	19 42	29 32	59-2	19 11	28 37	58-9	18 40	27 43	58-6	18 09	26 49	58-4	17 37	25 55	58-1	216 324		
37 143	20 43	30 07	58-6	20 12	29 13	58-3	19 40	28 19	58-0	19 08	27 25	57-7	18 36	26 31	57-4	18 03	25 38	57-1	217 323		
38 142	21 13	29 48	57-7	20 41	28 53	57-4	20 08	27 59	57-1	19 35	27 06	56-8	19 02	26 13	56-5	18 29	25 20	56-2	218 322		
39 141	21 43	29 27	56-8	21 10	28 33	56-4	20 36	27 40	56-1	19 29	26 47	55-8	19 29	25 54	55-5	18 55	25 02	55-2	219 321		
40 140	22 12	29 06	55-8	21 38	28 13	55-5	21 04	27 20	55-2	20 30	26 27	54-9	19 55	25 35	54-6	19 20	24 43	54-3	220 320		
41 139	22 41	28 44	54-9	22 06	27 51	54-5	21 31	26 59	54-2	20 56	26 07	53-9	20 21	25 15	53-6	19 45	24 24	53-3	221 319		
42 138	23 10	28 22	53-9	22 34	27 29	53-6	22 25	26 37	53-3	21 22	25 46	52-9	20 46	24 55	52-6	20 10	24 04	52-3	222 318		
43 137	23 38	27 59	53-0	23 02	27 07	52-6	22 50	26 15	52-3	21 48	25 24	52-0	21 11	24 34	51-7	20 34	23 43	51-4	223 317		
44 136	24 06	27 36	52-0	23 29	26 44	51-7	22 51	25 53	51-3	22 14	25 02	51-0	21 36	24 12	50-7	20 58	23 23	50-4	224 316		
45 135	24 34	27 11	51-0	23 56	26 20	50-7	23 17	25 30	50-3	22 39	24 40	50-0	22 00	23 50	49-7	21 21	23 01	49-4	225 315		

Lat. / A		54°			55°			56°			57°			58°			59°			Lat. / A	
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	°
45	135	24 34	27 11	51-0	23 56	26 20	50-3	23 17	25 30	50-3	22 39	24 40	50-0	22 00	23 50	49-7	21 21	23 01	49-4	225	315
46	134	25 01	26 47	50-0	24 22	25 56	49-7	23 43	25 30	49-4	22 39	24 17	49-0	22 24	23 50	48-7	21 45	23 01	48-4	226	314
47	133	25 28	26 22	49-1	24 48	25 32	48-7	24 08	24 42	48-4	23 28	23 53	48-0	22 48	23 05	47-7	22 08	22 17	47-4	227	313
48	132	25 54	25 56	48-1	25 14	25 06	47-7	24 33	24 42	47-4	23 53	23 29	47-0	23 11	22 41	46-7	22 30	21 54	46-4	228	312
49	131	26 20	25 29	47-1	25 39	24 40	46-7	24 58	23 52	46-4	24 16	23 05	46-0	23 34	22 17	45-7	22 52	21 31	45-4	229	311
50	130	26 46	25 02	46-0	26 04	24 14	45-7	25 22	23 26	45-3	24 40	22 39	45-0	23 57	21 53	44-7	23 14	21 07	44-4	230	310
51	129	27 11	24 34	45-0	26 28	23 47	44-7	25 45	23 00	44-3	25 02	22 14	44-0	24 19	21 28	43-7	23 36	20 43	43-4	231	309
52	128	27 36	24 06	44-0	26 52	23 19	43-6	26 39	22 33	43-3	25 25	21 48	43-0	24 41	21 03	42-7	23 57	20 18	42-3	232	308
53	127	28 00	23 37	43-0	27 16	22 51	42-6	26 02	22 06	42-3	25 47	21 21	41-9	25 02	20 37	41-6	24 17	19 53	41-3	233	307
54	126	28 24	23 07	41-9	27 39	22 22	41-6	26 54	21 38	41-2	26 09	20 54	40-9	25 23	20 10	40-6	24 37	19 27	40-3	234	306
55	125	28 47	22 37	40-9	28 01	21 53	40-5	27 16	21 09	40-2	26 30	20 26	39-9	25 44	19 43	39-5	24 57	19 01	39-2	235	305
56	124	29 10	22 07	39-8	28 24	21 23	39-5	27 37	20 40	39-1	26 50	19 57	38-8	26 04	19 16	38-5	25 17	18 34	38-2	236	304
57	123	29 32	21 35	38-8	28 45	20 52	38-4	27 58	20 10	38-1	27 11	19 29	37-8	26 23	18 48	37-4	25 35	18 07	37-1	237	303
58	122	29 54	21 03	37-7	29 06	20 21	37-3	28 19	19 40	37-0	27 31	18 59	36-7	26 42	18 19	36-4	25 54	17 40	36-1	238	302
59	121	30 15	20 31	36-6	29 27	19 50	36-3	28 38	19 09	35-9	27 50	18 30	35-6	27 01	17 50	35-3	26 12	17 12	35-0	239	301
60	120	30 36	19 58	35-5	29 47	19 18	35-2	28 58	18 38	34-9	28 09	17 59	34-5	27 19	17 21	34-2	26 29	16 43	34-0	240	300
61	119	30 56	19 24	34-4	30 07	18 45	34-1	29 17	18 06	33-8	28 27	17 29	33-5	27 37	16 51	33-2	26 46	16 14	32-9	241	299
62	118	31 16	18 50	33-3	30 26	18 12	33-0	29 35	17 34	32-7	28 45	16 57	32-4	27 54	16 21	32-1	27 03	15 45	31-8	242	298
63	117	31 35	18 15	32-2	30 44	17 38	31-9	29 53	17 02	31-6	29 02	16 26	31-3	28 10	15 50	31-0	27 19	15 15	30-7	243	297
64	116	31 53	17 40	31-1	31 02	17 04	30-8	30 10	16 28	30-5	29 15	15 53	30-2	28 27	15 19	29-9	27 35	14 45	29-6	244	296
65	115	32 11	17 04	30-0	31 19	16 29	29-7	30 27	15 55	29-4	29 35	15 21	29-1	28 42	14 48	28-8	28 04	14 15	28-5	245	295
66	114	32 29	16 28	28-8	31 36	15 54	28-5	30 43	15 20	28-2	29 50	14 48	28-0	28 57	14 16	27-7	27 50	13 44	27-4	246	294
67	113	32 45	15 51	27-7	31 52	15 18	27-4	30 59	14 46	27-1	30 05	14 14	26-8	29 12	13 43	26-6	28 18	13 13	26-3	247	293
68	112	33 01	15 14	26-5	32 08	14 42	26-3	31 14	14 11	26-0	30 20	13 40	25-7	29 26	13 10	25-5	28 31	12 41	25-2	248	292
69	111	33 17	14 36	25-4	32 23	14 05	25-1	31 28	13 35	24-8	30 34	13 06	24-6	29 39	12 37	24-4	28 44	12 09	24-1	249	291
70	110	33 32	13 57	24-2	32 37	13 28	24-0	31 42	12 59	23-7	30 47	12 31	23-5	29 52	12 04	23-2	28 57	11 37	23-0	250	290
71	109	33 46	13 18	23-1	32 51	12 51	22-8	31 55	12 23	22-6	31 12	11 56	22-3	30 04	11 30	22-1	29 09	11 04	21-9	251	289
72	108	33 59	12 39	21-9	33 04	12 13	21-6	32 08	11 46	21-4	31 23	11 21	21-2	30 16	10 56	21-0	29 20	10 31	20-8	252	288
73	107	34 12	12 00	20-7	33 16	11 34	20-5	32 20	11 09	20-2	31 34	10 45	20-0	30 27	10 21	19-8	29 30	9 58	19-6	253	287
74	106	34 24	11 19	19-5	33 28	10 55	19-3	32 31	10 32	19-1	31 44	10 09	18-9	30 37	9 46	18-7	29 41	9 24	18-5	254	286
75	105	34 36	10 39	18-3	33 39	10 16	18-1	32 42	9 54	17-9	31 44	9 32	17-7	30 47	9 11	17-5	29 50	8 50	17-4	255	285
76	104	34 46	9 58	17-1	33 49	9 37	16-9	32 52	9 16	16-7	31 54	8 56	16-6	30 57	8 36	16-4	29 59	8 16	16-2	256	284
77	103	34 56	9 17	15-9	33 59	8 57	15-7	33 01	8 38	15-6	32 03	8 19	15-4	31 05	8 00	15-2	30 07	7 42	15-1	257	283
78	102	35 06	8 35	14-7	34 08	8 17	14-5	33 10	7 59	14-4	32 11	7 41	14-2	31 13	7 24	14-1	30 15	7 07	13-9	258	282
79	101	35 14	7 54	13-5	34 16	7 37	13-3	33 18	7 20	13-2	32 19	7 04	13-0	31 21	6 48	12-9	30 22	6 32	12-8	259	281
80	100	35 22	7 11	12-3	34 24	6 56	12-1	33 25	6 41	12-0	32 26	6 26	11-9	31 27	6 12	11-7	30 29	5 57	11-6	260	280
81	99	35 29	6 29	11-1	34 30	6 15	10-9	33 32	6 01	10-8	32 33	5 48	10-7	31 34	5 35	10-6	30 35	5 22	10-5	261	279
82	98	35 36	5 46	9-9	34 37	5 34	9-7	33 37	5 22	9-6	32 38	5 10	9-5	31 39	4 58	9-4	30 40	4 47	9-3	262	278
83	97	35 41	5 04	8-6	34 42	4 53	8-5	33 43	4 42	8-4	32 43	4 32	8-3	31 44	4 21	8-2	30 45	4 11	8-2	263	277
84	96	35 46	4 21	7-4	34 47	4 11	7-3	33 47	4 02	7-2	32 48	3 53	7-1	31 48	3 44	7-1	30 49	3 36	7-0	264	276
85	95	35 51	3 37	6-2	34 51	3 30	6-0	33 51	3 22	6-0	32 52	3 14	6-0	31 52	3 07	5-9	30 52	3 00	5-8	265	275
86	94	35 54	2 54	4-9	34 54	2 48	4-9	33 54	2 42	4-8	32 55	2 36	4-8	31 55	2 30	4-7	30 55	2 24	4-7	266	274
87	93	35 57	2 11	3-7	34 57	2 06	3-7	33 57	2 01	3-6	32 57	1 57	3-6	31 57	1 52	3-5	30 57	1 48	3-5	267	273
88	92	35 58	1 27	2-5	34 59	1 24	2-4	33 59	1 21	2-4	32 59	1 38	2-4	31 59	1 15	2-4	30 59	1 12	2-3	268	272
89	91	36 00	0 44	1-2	35 00	0 42	1-2	34 00	0 40	1-2	33 00	0 39	1-2	32 00	0 37	1-2	31 00	0 36	1-2	269	271
90	90	36 00	0 00	0-0	35 00	0 00	0-0	34 00	0 00	0-0	33 00	0 00	0-0	32 00	0 00	0-0	31 00	0 00	0-0	270	270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z
S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

B: (–) for 90° < LHA < 270°
Dec: (–) for Lat. contrary name

SIGHT REDUCTION TABLE

SIGHT REDUCTION TABLE																			
Z ₁ : same sign as B; Z ₂ : (–) for Lat. contrary name																			
60°			61°			62°			63°			64°			65°			Lat. / A	
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
0 180	0 00	30 00	90-0	0 00	29 00	90-0	0 00	28 00	90-0	0 00	27 00	90-0	0 00	26 00	90-0	0 00	25 00	90-0	180
1 179	0 30	30 00	89-1	0 29	29 00	89-1	0 28	28 00	89-1	0 27	27 00	89-1	0 26	26 00	89-1	0 25	25 00	89-1	181
2 178	1 00	29 59	88-3	0 58	28 59	88-3	0 56	27 59	88-2	0 54	26 59	88-2	0 53	26 00	88-2	0 51	24 59	88-2	182
3 177	1 30	29 58	87-4	1 27	28 58	87-4	1 24	27 58	87-4	1 22	26 58	87-3	1 19	25 58	87-3	1 16	24 58	87-3	183
4 176	2 00	29 56	86-5	1 56	28 56	86-5	1 53	27 57	86-5	1 49	26 57	86-4	1 45	25 57	86-4	1 41	24 57	86-4	184
5 175	2 30	29 54	85-7	2 25	28 54	85-6	2 21	27 55	85-6	2 16	26 55	85-5	2 11	25 55	85-5	2 07	24 55	85-5	185
6 174	3 00	29 52	84-8	2 54	28 52	84-7	2 49	27 52	84-7	2 43	26 52	84-6	2 38	25 53	84-6	2 32	24 53	84-6	186
7 173	3 30	29 49	83-9	3 23	28 49	83-9	3 17	27 49	83-8	3 10	26 50	83-8	3 04	25 50	83-7	2 57	24 50	83-7	187
8 172	3 59	29 45	83-1	3 52	28 46	83-0	3 45	27 46	82-9	3 37	26 46	82-9	3 30	25 47	82-8	3 22	24 47	82-7	188
9 171	4 29	29 42	82-2	4 21	28 42	82-1	4 13	27 42	82-0	4 04	26 43	82-0	3 56	25 43	81-9	3 47	24 44	81-8	189
10 170	4 59	29 37	81-3	4 50	28 38	81-2	4 41	27 38	81-2	4 31	26 39	81-1	4 22	25 39	81-0	4 13	24 40	80-9	190
11 169	5 28	29 33	80-4	5 18	28 33	80-4	5 08	27 34	80-3	4 58	26 34	80-2	4 48	25 35	80-1	4 38	24 36	80-0	191
12 168	5 58	29 27	79-6	5 47	28 28	79-5	5 36	27 29	79-4	5 25	26 29	79-3	5 14	25 30	79-2	5 02	24 31	79-1	192
13 167	6 27	29 22	78-7	6 16	28 22	78-6	6 04	27 23	78-5	5 52	26 24	78-4	5 40	25 25	78-3	5 27	24 26	78-2	193
14 166	6 57	29 15	77-8	6 44	28 16	77-7	6 31	27 17	77-6	6 18	26 18	77-5	6 05	25 20	77-4	5 52	24 21	77-3	194
15 165	7 26	29 09	76-9	7 13	28 10	76-8	6 59	27 11	76-7	6 45	26 12	76-6	6 31	25 14	76-5	6 17	24 15	76-4	195
16 164	7 55	29 02	76-1	7 41	28 03	75-9	7 26	27 04	75-8	7 11	26 06	75-7	6 56	25 07	75-6	6 41	24 09	75-4	196
17 163	8 24	28 54	75-2	8 09	27 56	75-0	7 53	26 57	74-9	7 38	25 59	74-8	7 22	25 00	74-6	7 06	24 02	74-5	197
18 162	8 53	28 46	74-3	8 37	27 48	74-1	8 20	26 50	74-0	8 04	25 51	73-9	7 47	24 53	73-7	7 30	23 55	73-6	198
19 161	9 22	28 38	73-4	9 05	27 40	73-2	8 48	26 41	73-1	8 30	25 43	72-9	8 12	24 45	72-8	7 55	23 48	72-7	199
20 160	9 51	28 29	72-5	9 33	27 31	72-3	9 14	26 33	72-2	8 56	25 35	72-0	8 37	24 37	71-9	8 19	23 40	71-8	200
21 159	10 19	28 19	71-6	10 00	27 22	71-4	9 41	26 24	71-3	9 22	25 26	71-1	9 02	24 29	71-0	8 43	23 32	70-8	201
22 158	10 48	28 10	70-7	10 28	27 12	70-5	10 08	26 15	70-4	9 48	25 17	70-2	9 27	24 20	70-0	9 07	23 23	69-9	202
23 157	11 16	27 59	69-8	10 55	27 02	69-6	10 34	26 05	69-5	10 13	25 08	69-3	9 52	24 11	69-1	9 30	23 14	69-0	203
24 156	11 44	27 49	68-9	11 22	26 51	68-7	11 00	25 54	68-5	10 38	24 58	68-4	10 16	24 01	68-2	9 54	23 04	68-0	204
25 155	12 12	27 37	68-0	11 49	26 40	67-8	11 27	25 44	67-6	11 04	24 47	67-4	10 41	23 51	67-3	10 17	22 55	67-1	205
26 154	12 40	27 26	67-1	12 16	26 29	66-9	11 53	25 33	66-7	11 29	24 36	66-5	11 05	23 40	66-3	10 41	22 44	66-2	206
27 153	13 07	27 13	66-2	12 43	26 17	66-0	12 18	25 21	65-8	11 54	24 25	65-6	11 29	23 29	65-4	11 04	22 34	65-2	207
28 152	13 35	27 01	65-3	13 09	26 05	65-1	12 44	25 09	64-9	12 18	24 13	64-7	11 53	23 18	64-5	11 27	22 23	64-3	208
29 151	14 02	26 48	64-4	13 36	25 52	64-1	13 09	24 56	63-9	12 43	24 01	63-7	12 16	23 06	63-5	11 49	22 11	63-3	209
30 150	14 29	26 34	63-4	14 02	25 39	63-2	13 35	24 43	63-0	13 07	23 49	62-8	12 40	22 54	62-6	12 12	21 59	62-4	210
31 149	14 55	26 20	62-5	14 28	25 25	62-3	14 00	24 30	62-1	13 31	23 36	61-8	13 03	22 41	61-6	12 34	21 47	61-4	211
32 148	15 22	26 05	61-6	14 53	25 11	61-3	14 24	24 16	61-1	13 55	23 22	60-9	13 26	22 28	60-7	12 56	21 35	60-5	212
33 147	15 48	25 50	60-6	15 19	24 56	60-4	14 49	24 02	60-2	14 19	23 08	59-9	13 49	22 15	59-7	13 18	21 22	59-5	213
34 146	16 14	25 35	59-7	15 44	24 41	59-5	15 13	23 47	59-2	14 42	22 54	59-0	14 11	22 01	58-8	13 40	21 08	58-6	214
35 145	16 40	25 19	58-8	16 09	24 25	58-5	15 37	23 32	58-3	15 06	22 39	58-0	14 34	21 47	57-8	14 02	20 54	57-6	215
36 144	17 05	25 02	57-8	16 33	24 09	57-6	16 01	23 17	57-3	15 29	22 24	57-1	14 56	21 32	56-9	14 23	20 40	56-6	216
37 143	17 31	24 45	56-9	16 58	23 53	56-6	16 25	23 00	56-4	15 51	22 09	56-1	15 18	21 17	55-9	14 44	20 26	55-7	217
38 142	17 56	24 28	55-9	17 22	23 36	55-7	16 48	22 44	55-4	16 14	21 53	55-2	15 39	21 01	54-9	15 05	20 11	54-7	218
39 141	18 20	24 10	55-0	17 46	23 18	54-7	17 11	22 27	54-4	16 36	21 36	54-2	16 01	20 46	54-0	15 25	19 55	53-7	219
40 140	18 45	23 52	54-0	18 09	23 00	53-7	17 34	22 10	53-5	16 58	21 19	53-2	16 22	20 29	53-0	15 46	19 39	52-7	220
41 139	19 09	23 33	53-0	18 33	22 42	52-8	17 56	21 52	52-5	17 20	21 02	52-2	16 43	20 13	52-0	16 06	19 23	51-8	221
42 138	19 33	23 13	52-1	18 56	22 23	51-8	18 19	21 34	51-5	17 41	20 44	51-3	17 03	19 55	51-0	16 26	19 07	50-8	222
43 137	19 56	22 54	51-1	19 18	22 04	50-8	18 40	21 15	50-5	18 02	20 26	50-3	17 24	19 38	50-0	16 45	18 50	49-8	223
44 136	20 19	22 33	50-1	19 41	21 44	49-8	19 02	20 56	49-5	18 23	20 08	49-3	17 44	19 20	49-0	17 04	18 33	48-8	224
45 135	20 42	22 12	49-1	20 03	21 24	48-8	19 23	20 36	48-6	18 43	19 49	48-3	18 03	19 02	48-1	17 23	18 15	47-8	225

Lat. / A		60°			61°			62°			63°			64°			65°			Lat. / A
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	135	20 42	22 12	49.1	20 03	21 24	48.8	19 23	20 36	48.6	18 43	19 49	48.3	18 03	19 02	48.1	17 23	18 15	47.8	225
46	134	21 05	21 51	48.1	20 25	21 04	47.8	19 44	20 16	47.6	19 04	19 29	47.3	18 23	18 43	47.1	17 42	17 57	46.8	226
47	133	21 27	21 30	47.1	20 46	20 43	46.8	20 05	19 56	46.6	19 24	19 10	46.3	18 42	18 24	46.1	18 00	17 39	45.8	227
48	132	21 49	21 07	46.1	21 07	20 21	45.8	20 25	19 35	45.6	19 43	18 50	45.3	19 01	18 04	45.1	18 18	17 20	44.8	228
49	131	22 10	20 45	45.1	21 28	19 59	44.8	20 45	19 14	44.6	20 02	18 29	44.3	19 19	17 45	44.0	18 36	17 01	43.8	229
50	130	22 31	20 22	44.1	21 48	19 37	43.8	21 05	18 52	43.5	20 21	18 08	43.3	19 37	17 24	43.0	18 53	16 41	42.8	230
51	129	22 52	19 58	43.1	22 08	19 14	42.8	21 24	18 30	42.5	20 40	17 47	42.3	19 55	17 04	42.0	19 10	16 21	41.8	231
52	128	23 12	19 34	42.1	22 28	18 51	41.8	21 43	18 08	41.5	20 58	17 25	41.2	20 13	16 43	41.0	19 27	16 01	40.8	232
53	127	23 32	19 10	41.0	22 47	18 27	40.7	22 01	17 45	40.5	21 15	17 03	40.2	20 30	16 21	40.0	19 44	15 41	39.7	233
54	126	23 52	18 45	40.0	23 06	18 03	39.7	22 19	17 21	39.4	21 33	16 40	39.2	20 46	16 00	39.0	20 00	15 20	38.7	234
55	125	24 11	18 19	39.0	23 24	17 38	38.7	22 37	16 58	38.4	21 50	16 17	38.2	21 03	15 38	37.9	20 15	14 58	37.7	235
56	124	24 29	17 54	37.9	23 42	17 13	37.6	22 54	16 34	37.4	22 07	15 54	37.1	21 19	15 15	36.9	20 31	14 37	36.7	236
57	123	24 48	17 27	36.9	23 59	16 48	36.6	23 11	16 09	36.3	22 23	15 31	36.1	21 34	14 53	35.8	20 46	14 15	35.6	237
58	122	25 05	17 01	35.8	24 17	16 22	35.5	23 28	15 44	35.3	22 39	15 07	35.0	21 49	14 29	34.8	21 00	13 53	34.6	238
59	121	25 23	16 34	34.8	24 33	15 56	34.5	23 44	15 19	34.2	22 54	14 42	34.0	22 04	14 06	33.8	21 14	13 30	33.5	239
60	120	25 40	16 06	33.7	24 50	15 29	33.4	23 59	14 53	33.2	23 09	14 18	32.9	22 19	13 42	32.7	21 28	13 07	32.5	240
61	119	25 56	15 38	32.6	25 05	15 03	32.4	24 15	14 27	32.1	23 24	13 53	31.9	22 33	13 18	31.7	21 42	12 44	31.5	241
62	118	26 12	15 10	31.5	25 21	14 35	31.3	24 29	14 01	31.1	23 38	13 27	30.8	22 46	12 54	30.6	21 55	12 21	30.4	242
63	117	26 27	14 41	30.5	25 36	14 08	30.2	24 44	13 34	30.0	23 52	13 01	29.8	22 59	12 29	29.5	22 07	11 57	29.3	243
64	116	26 42	14 12	29.4	25 50	13 39	29.1	24 57	13 07	28.9	24 05	12 35	28.7	23 12	12 04	28.5	22 19	11 33	28.3	244
65	115	26 57	13 43	28.3	26 04	13 11	28.1	25 11	12 40	27.8	24 18	12 09	27.6	23 25	11 39	27.4	22 31	11 09	27.2	245
66	114	27 11	13 13	27.2	26 17	12 42	27.0	25 24	12 12	26.8	24 30	11 43	26.6	23 36	11 13	26.4	22 43	10 44	26.2	246
67	113	27 24	12 43	26.1	26 30	12 13	25.9	25 36	11 44	25.7	24 42	11 16	25.5	23 48	10 47	25.3	22 54	10 20	25.1	247
68	112	27 37	12 12	25.0	26 43	11 44	24.8	25 48	11 16	24.6	24 54	10 48	24.4	23 59	10 21	24.2	23 04	9 55	24.0	248
69	111	27 50	11 41	23.9	26 55	11 14	23.7	26 00	10 47	23.5	25 05	10 21	23.3	24 09	9 55	23.1	23 14	9 29	23.0	249
70	110	28 01	11 10	22.8	27 06	10 44	22.6	26 11	10 18	22.4	25 15	9 55	22.2	24 20	9 28	22.0	23 24	9 04	21.9	250
71	109	28 13	10 39	21.7	27 17	10 14	21.5	26 21	9 49	21.3	25 25	9 25	21.1	24 29	9 01	21.0	23 33	8 38	20.8	251
72	108	28 24	10 07	20.6	27 27	9 43	20.4	26 31	9 20	20.2	25 35	8 57	20.0	24 38	8 34	19.9	23 42	8 12	19.7	252
73	107	28 34	9 35	19.4	27 37	9 12	19.3	26 41	8 50	19.1	25 44	8 28	18.9	24 47	8 07	18.8	23 50	7 46	18.6	253
74	106	28 44	9 03	18.3	27 47	8 41	18.2	26 50	8 20	18.0	25 52	8 00	17.8	24 55	7 39	17.7	23 58	7 19	17.6	254
75	105	28 53	8 30	17.2	27 55	8 10	17.0	26 58	7 50	16.9	26 01	7 31	16.7	25 03	7 12	16.6	24 06	6 53	16.5	255
76	104	29 01	7 57	16.1	28 04	7 38	15.9	27 06	7 20	15.8	26 08	7 02	15.6	25 10	6 44	15.5	24 13	6 26	15.4	256
77	103	29 09	7 24	14.9	28 11	7 06	14.8	27 13	6 49	14.7	26 15	6 32	14.5	25 17	6 16	14.4	24 19	5 59	14.3	257
78	102	29 17	6 51	13.8	28 18	6 34	13.7	27 20	6 19	13.5	26 22	6 03	13.4	25 23	5 47	13.3	24 25	5 32	13.2	258
79	101	29 24	6 17	12.7	28 25	6 02	12.5	27 27	5 48	12.4	26 28	5 33	12.3	25 29	5 19	12.2	24 31	5 05	12.1	259
80	100	29 30	5 44	11.5	28 31	5 30	11.4	27 32	5 17	11.3	26 33	5 03	11.2	25 35	4 50	11.1	24 36	4 38	11.0	260
81	99	29 36	5 10	10.4	28 37	4 57	10.3	27 38	4 45	10.2	26 38	4 33	10.1	25 39	4 22	10.0	24 40	4 10	9.9	261
82	98	29 41	4 36	9.2	28 41	4 25	9.1	27 42	4 14	9.0	26 43	4 03	9.0	25 44	3 53	8.9	24 44	3 43	8.8	262
83	97	29 45	4 01	8.1	28 46	3 52	8.0	27 46	3 42	7.9	26 47	3 33	7.8	25 48	3 24	7.8	24 48	3 15	7.7	263
84	96	29 49	3 27	6.9	28 50	3 19	6.9	27 50	3 11	6.8	26 50	3 03	6.7	25 51	2 55	6.7	24 51	2 47	6.6	264
85	95	29 52	2 53	5.8	28 53	2 46	5.7	27 53	2 39	5.7	26 53	2 26	5.6	25 54	2 26	5.6	24 54	2 20	5.5	265
86	94	29 55	2 18	4.6	28 55	2 13	4.6	27 56	2 07	4.5	26 56	2 02	4.5	25 56	1 57	4.4	24 56	1 52	4.4	266
87	93	29 57	1 44	3.5	28 57	1 40	3.4	27 57	1 36	3.4	26 58	1 32	3.4	25 58	1 28	3.3	24 58	1 24	3.3	267
88	92	29 59	1 09	2.3	28 59	1 06	2.3	27 59	1 04	2.3	26 59	1 01	2.2	25 59	0 59	2.2	24 59	0 56	2.2	268
89	91	30 00	0 35	1.2	29 00	0 33	1.1	28 00	0 32	1.1	27 00	0 31	1.1	26 00	0 29	1.1	25 00	0 28	1.1	269
90	90	30 00	0 00	0.0	29 00	0 00	0.0	28 00	0 00	0.0	27 00	0 00	0.0	26 00	0 00	0.0	25 00	0 00	0.0	270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

B: (–) for 90° < LHA < 270°
Dec: (–) for Lat. contrary name

Z₁: same sign as B
Z₂: (–) for F > 90°

Lat. / A		66°			67°			68°			69°			70°			71°			Lat. / A
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	
0	0 00	24 00	90-0	0 00	23 00	90-0	0 00	22 00	90-0	0 00	21 00	90-0	0 00	20 00	90-0	0 00	19 00	90-0	180	
1	0 24	24 00	89-1	0 23	23 00	89-1	0 22	22 00	89-1	0 22	21 00	89-1	0 21	20 00	89-1	0 20	19 00	89-1	181	
2	0 179	0 49	23 59	0 47	22 59	88-2	0 45	21 59	88-1	0 43	20 59	88-1	0 41	19 59	88-1	0 39	18 59	88-1	182	
3	0 178	0 49	23 58	0 47	22 58	87-2	1 07	21 58	87-2	1 04	20 58	87-2	1 02	19 58	87-2	0 59	18 59	87-2	183	
4	0 176	1 38	23 57	1 34	22 57	86-3	1 30	21 57	86-3	1 26	20 57	86-3	1 22	19 57	86-2	1 18	18 57	86-2	184	
5	0 175	2 02	23 55	1 57	22 55	85-4	1 52	21 55	85-4	1 47	20 56	85-3	1 42	19 56	85-3	1 38	18 56	85-3	185	
6	0 174	2 26	23 53	2 20	22 53	84-5	2 15	21 53	84-4	2 09	20 54	84-4	2 03	19 54	84-4	1 57	18 54	84-3	186	
7	0 173	2 50	23 50	2 44	22 51	83-6	2 37	21 51	83-5	2 30	20 51	83-5	2 23	19 52	83-4	2 16	18 52	83-4	187	
8	0 172	3 15	23 48	3 07	22 48	82-6	2 59	21 48	82-6	2 52	20 49	82-5	2 44	19 49	82-5	2 36	18 50	82-4	188	
9	0 171	3 39	23 44	3 30	22 45	81-7	3 22	21 45	81-6	3 13	20 46	81-6	3 04	19 46	81-5	2 55	18 47	81-5	189	
10	0 170	4 03	23 41	3 53	22 41	80-8	3 44	21 42	80-7	3 34	20 42	80-7	3 24	19 43	80-6	3 14	18 44	80-5	190	
11	0 169	4 27	23 36	4 17	22 37	79-9	4 06	21 38	79-8	3 55	20 39	79-7	3 45	19 40	79-6	3 34	18 41	79-6	191	
12	0 168	4 51	23 32	4 40	22 33	78-9	4 28	21 34	78-9	4 16	20 35	78-8	4 05	19 36	78-7	3 53	18 37	78-6	192	
13	0 167	5 15	23 27	5 03	22 28	78-0	4 50	21 29	77-9	4 37	20 30	77-8	4 25	19 32	77-8	4 12	18 33	77-7	193	
14	0 166	5 39	23 22	5 25	22 23	77-1	5 12	21 24	77-0	4 58	20 26	76-9	4 45	19 27	76-8	4 31	18 28	76-7	194	
15	0 165	6 03	23 16	5 48	22 18	76-2	5 34	21 19	76-0	5 19	20 21	76-0	5 05	19 22	75-9	4 50	18 24	75-8	195	
16	0 164	6 26	23 10	6 11	22 12	75-3	5 56	21 13	75-1	5 40	20 15	75-0	5 25	19 17	74-9	5 09	18 19	74-8	196	
17	0 163	6 50	23 04	6 34	22 06	74-3	6 17	21 08	74-2	6 01	20 09	74-1	5 44	19 11	74-0	5 28	18 14	73-9	197	
18	0 162	7 13	22 57	6 56	21 59	73-5	6 39	21 01	73-2	6 21	20 03	73-1	6 04	19 06	73-0	5 46	18 08	72-9	198	
19	0 161	7 37	22 50	7 19	21 52	72-5	7 00	20 54	72-3	6 42	19 57	72-2	6 24	18 59	72-1	6 05	18 02	72-0	199	
20	0 160	8 00	22 42	7 41	21 45	71-5	7 22	20 47	71-4	7 02	19 50	71-2	6 43	18 53	71-1	6 24	17 56	71-0	200	
21	0 159	8 23	22 34	8 03	21 37	70-5	7 43	20 40	70-4	7 23	19 43	70-3	7 02	18 46	70-2	6 42	17 49	70-1	201	
22	0 158	8 46	22 26	8 25	21 29	69-6	8 04	20 32	69-5	7 43	19 35	69-3	7 22	18 39	69-2	7 00	17 42	69-1	202	
23	0 157	9 09	22 17	8 47	21 21	68-8	8 25	20 24	68-5	8 03	19 28	68-4	7 41	18 31	68-3	7 19	17 35	68-1	203	
24	0 156	9 31	22 08	9 09	21 12	67-7	8 46	20 16	67-6	8 23	19 19	67-4	8 00	18 24	67-3	7 37	17 28	67-2	204	
25	0 155	9 54	21 58	9 30	21 03	66-8	9 07	20 07	66-6	8 43	19 11	66-5	8 19	18 15	66-3	7 55	17 20	66-2	205	
26	0 154	10 16	21 49	9 52	20 53	65-8	9 27	19 57	65-7	9 02	19 02	65-5	8 37	18 07	65-4	8 12	17 12	65-2	206	
27	0 153	10 38	21 38	10 13	20 43	64-9	9 48	19 48	64-7	9 22	18 53	64-6	8 56	17 58	64-4	8 30	17 03	64-3	207	
28	0 152	11 00	21 28	10 34	20 33	63-9	10 08	19 38	63-8	9 41	18 43	63-6	9 14	17 49	63-5	8 48	16 55	63-3	208	
29	0 151	11 22	21 17	10 55	20 22	63-0	10 28	19 28	62-8	10 00	18 34	62-6	9 33	17 39	62-5	9 05	16 46	62-3	209	
30	0 150	11 44	21 05	11 16	20 11	62-0	10 48	19 17	61-8	10 19	18 23	61-7	9 51	17 30	61-5	9 22	16 36	61-4	210	
31	0 149	12 06	20 53	11 37	20 00	61-1	11 07	19 06	60-9	10 38	18 13	60-7	10 09	17 20	60-5	9 39	16 27	60-4	211	
32	0 148	12 27	20 41	11 57	19 48	60-1	11 27	18 55	59-9	10 57	18 02	59-7	10 27	17 09	59-6	9 56	16 17	59-4	212	
33	0 147	12 48	20 29	12 17	19 36	59-1	11 46	18 43	58-9	11 15	17 51	58-8	10 44	16 58	58-6	10 13	16 06	58-4	213	
34	0 146	13 09	20 16	12 37	19 23	58-2	12 06	18 31	58-0	11 34	17 39	57-8	11 02	16 47	57-6	10 29	15 56	57-5	214	
35	0 145	13 29	20 02	12 57	19 10	57-2	12 24	18 19	57-0	11 52	17 27	56-8	11 19	16 36	56-7	10 46	15 45	56-5	215	
36	0 144	13 50	19 49	13 17	18 57	56-2	12 43	18 06	56-0	12 10	17 15	55-9	11 36	16 24	55-7	11 02	15 34	55-5	216	
37	0 143	14 10	19 34	13 36	18 44	55-3	13 02	17 53	55-1	12 27	17 03	54-9	11 53	16 12	54-7	11 18	15 23	54-5	217	
38	0 142	14 30	19 20	13 55	18 30	54-3	13 20	17 40	54-1	12 45	16 50	53-9	12 09	16 00	53-7	11 34	15 11	53-5	218	
39	0 141	14 50	19 05	14 14	18 15	53-3	13 38	17 26	53-1	13 02	16 37	52-9	12 26	15 48	52-7	11 49	14 59	52-6	219	
40	0 140	15 09	18 50	14 33	18 01	52-3	13 56	17 12	52-1	13 19	16 23	51-9	12 42	15 35	51-7	12 05	14 47	51-6	220	
41	0 139	15 29	18 34	14 51	17 46	51-3	14 14	16 57	51-1	13 36	16 09	50-9	12 58	15 22	50-8	12 20	14 34	50-6	221	
42	0 138	15 48	18 18	15 09	17 30	50-3	14 31	16 43	50-1	13 52	15 55	49-9	13 14	15 08	49-8	12 35	14 21	49-6	222	
43	0 137	16 06	18 02	15 27	17 15	49-4	14 48	16 28	49-2	14 09	15 41	49-0	13 29	14 54	48-8	12 50	14 08	48-6	223	
44	0 136	16 25	17 46	15 45	16 59	48-4	15 05	16 12	48-2	14 25	15 26	48-0	13 45	14 40	47-8	13 04	13 55	47-6	224	
45	0 135	16 43	17 29	16 02	16 42	47-4	15 22	15 57	47-2	14 41	15 11	47-0	14 00	14 26	46-8	13 19	13 41	46-6	225	

Lat. / A		66°			67°			68°			69°			70°			71°			Lat. / A
LHA/F	°	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	135	16 43	17 29	47-6	16 02	16 42	47-4	15 22	15 57	47-2	14 41	15 11	47-0	14 00	14 26	46-8	13 19	13 41	46-6	225
46	134	17 01	17 11	46-6	16 19	16 26	46-4	15 38	15 41	46-2	14 56	14 56	46-0	14 15	14 11	45-8	13 33	13 27	45-6	226
47	133	17 18	16 53	45-6	16 36	16 09	45-4	15 54	15 24	45-2	15 12	14 40	45-0	14 29	13 56	44-8	13 46	13 13	44-6	227
48	132	17 36	16 35	44-6	16 53	15 51	44-4	16 10	15 08	44-2	16 27	14 24	44-0	14 43	13 41	44-8	14 00	12 58	43-6	228
49	131	17 53	16 17	43-6	17 09	15 34	43-4	16 25	14 51	43-2	15 42	14 08	43-0	14 58	13 26	42-8	14 13	12 44	42-6	229
50	130	18 09	15 58	42-6	17 25	15 16	42-4	16 41	14 33	42-1	15 56	13 52	41-9	15 11	13 10	41-8	14 27	12 29	41-6	230
51	129	18 26	15 39	41-6	17 41	14 57	41-3	16 56	14 16	41-1	16 10	13 35	40-9	15 25	12 54	40-8	14 39	12 14	40-6	231
52	128	18 42	15 20	40-5	17 56	14 39	40-3	17 10	13 58	40-1	16 24	13 18	39-9	15 38	12 38	39-7	14 52	11 58	39-6	232
53	127	18 57	15 00	39-5	18 11	14 20	39-3	17 24	13 40	39-1	16 38	13 00	38-9	15 51	12 21	38-7	15 04	11 42	38-6	233
54	126	19 13	14 40	38-5	18 26	14 01	38-3	17 39	13 22	38-1	16 51	12 43	37-9	16 04	12 05	37-7	15 16	11 26	37-5	234
55	125	19 28	14 20	37-5	18 40	13 41	37-3	17 52	13 03	37-1	17 04	12 25	36-9	16 16	11 48	36-7	15 28	11 10	36-5	235
56	124	19 42	13 59	36-4	18 54	13 21	36-2	18 06	12 44	36-0	17 17	12 07	35-8	16 28	11 30	35-7	15 40	10 54	35-5	236
57	123	19 57	13 38	35-4	19 08	13 01	35-2	18 19	12 25	35-0	17 29	11 49	34-8	16 40	11 13	34-6	15 51	10 37	34-5	237
58	122	20 11	13 17	34-4	19 21	12 41	34-2	18 31	12 05	34-0	17 42	11 30	33-8	16 52	10 55	33-6	16 02	10 20	33-5	238
59	121	20 24	12 55	33-3	19 34	12 20	33-1	18 44	11 45	32-9	17 53	11 11	32-8	17 03	10 37	32-6	16 12	10 03	32-4	239
60	120	20 37	12 33	32-3	19 47	11 59	32-1	18 56	11 25	31-9	18 05	10 52	31-7	17 14	10 19	31-6	16 23	9 46	31-4	240
61	119	20 50	12 11	31-2	19 59	11 38	31-1	19 08	11 05	30-9	18 16	10 33	30-7	17 24	10 00	30-5	16 33	9 29	30-4	241
62	118	21 03	11 48	30-2	20 11	11 16	30-0	19 19	10 44	29-8	18 27	10 13	29-7	17 35	9 42	29-5	16 42	9 11	29-4	242
63	117	21 15	11 26	29-2	20 22	10 54	29-0	19 30	10 24	28-8	18 37	9 53	28-6	17 45	9 23	28-5	16 52	8 53	28-3	243
64	116	21 27	11 03	28-1	20 34	10 32	27-9	19 41	10 03	27-7	18 47	9 33	27-6	17 54	9 04	27-4	17 01	8 35	27-3	244
65	115	21 38	10 39	27-0	20 44	10 10	26-9	19 51	9 41	26-7	18 57	9 13	26-5	18 03	8 45	26-4	17 10	8 17	26-3	245
66	114	21 49	10 16	26-0	20 55	9 48	25-8	20 01	9 20	25-7	19 07	8 52	25-5	18 12	8 25	25-4	17 18	7 58	25-2	246
67	113	21 59	9 52	24-9	21 05	9 25	24-8	20 10	8 58	24-6	19 16	8 32	24-5	18 21	8 06	24-3	17 26	7 40	24-2	247
68	112	22 09	9 28	23-9	21 14	9 02	23-7	20 19	8 36	23-5	19 24	8 11	23-4	18 29	7 46	23-3	17 34	7 21	23-1	248
69	111	22 19	9 04	22-8	21 24	8 39	22-6	20 28	8 14	22-5	19 33	7 50	22-4	18 37	7 26	22-2	17 42	7 02	22-1	249
70	110	22 28	8 39	21-7	21 32	8 16	21-6	20 37	7 52	21-4	19 41	7 29	21-3	18 45	7 06	21-2	17 49	6 43	21-1	250
71	109	22 37	8 15	20-7	21 41	7 52	20-5	20 45	7 30	20-4	19 48	7 07	20-2	18 52	6 45	20-1	17 56	6 24	20-0	251
72	108	22 45	7 50	19-6	21 49	7 28	19-4	20 52	7 07	19-3	19 56	6 46	19-2	18 59	6 25	19-1	18 02	6 04	19-0	252
73	107	22 53	7 25	18-5	21 56	7 04	18-4	21 00	6 44	18-2	20 03	6 24	18-1	19 05	6 04	18-0	18 08	5 45	17-9	253
74	106	23 01	7 00	17-4	22 04	6 40	17-3	21 06	6 21	17-2	20 09	6 02	17-1	19 12	5 44	17-0	18 14	5 25	16-9	254
75	105	23 08	6 34	16-3	22 10	6 16	16-2	21 13	5 58	16-1	20 15	5 40	16-0	19 17	5 23	15-9	18 20	5 06	15-8	255
76	104	23 15	6 09	15-3	22 17	5 52	15-2	21 19	5 35	15-1	20 21	5 18	15-0	19 23	5 02	14-9	18 25	4 46	14-8	256
77	103	23 21	5 43	14-2	22 23	5 27	14-1	21 24	5 12	14-0	20 26	4 56	13-9	19 28	4 41	13-8	18 30	4 26	13-7	257
78	102	23 27	5 17	13-1	22 28	5 03	13-0	21 30	4 48	12-9	20 31	4 34	12-8	19 33	4 20	12-7	18 34	4 06	12-6	258
79	101	23 32	4 51	12-0	22 33	4 38	11-9	21 35	4 24	11-8	20 36	4 11	11-8	19 37	3 58	11-7	18 38	3 46	11-6	259
80	100	23 37	4 25	10-9	22 38	4 13	10-8	21 39	4 01	10-8	20 40	3 49	10-7	19 41	3 37	10-6	18 42	3 25	10-6	260
81	99	23 41	3 59	9-8	22 42	3 48	9-8	21 43	3 37	9-7	20 44	3 26	9-6	19 45	3 16	9-6	18 45	3 05	9-5	261
82	98	23 45	3 33	8-7	22 46	3 23	8-7	21 46	3 13	8-6	20 47	3 03	8-6	19 48	3 03	8-5	18 48	2 45	8-5	262
83	97	23 49	3 06	7-7	22 49	2 58	7-6	21 50	2 49	7-5	20 50	2 41	7-5	19 51	2 32	7-4	18 51	2 24	7-4	263
84	96	23 52	2 40	6-6	22 52	2 32	6-5	21 52	2 25	6-5	20 53	2 18	6-4	19 53	2 11	6-4	18 54	2 04	6-3	264
85	95	23 54	2 13	5-5	22 54	2 07	5-4	21 55	2 01	5-5	20 55	1 55	5-4	19 55	1 49	5-3	18 55	1 43	5-3	265
86	94	23 56	1 47	4-4	22 56	1 42	4-3	21 57	1 37	4-3	20 57	1 32	4-3	19 57	1 27	4-3	18 57	1 23	4-2	266
87	93	23 58	1 20	3-3	22 58	1 16	3-3	21 58	1 13	3-2	20 58	1 09	3-2	19 58	1 05	3-2	18 58	1 02	3-2	267
88	92	23 59	0 53	2-2	22 59	0 51	2-2	21 59	0 48	2-2	20 59	0 46	2-1	19 59	0 44	2-1	18 59	0 41	2-1	268
89	91	24 00	0 27	1-1	23 00	0 25	1-1	22 00	0 24	1-1	21 00	0 23	1-1	20 00	0 22	1-1	19 00	0 21	1-1	269
90	90	24 00	0 00	0-0	23 00	0 00	0-0	22 00	0 00	0-0	21 00	0 00	0-0	20 00	0 00	0-0	19 00	0 00	0-0	270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

SIGHT REDUCTION TABLE										Z ₁ : same sign as B Z ₂ : (—) for F > 90°																		
B: (—) for 90° < LHA < 270° Dec: (—) for Lat. contrary name										77°																		
Lat. / A		72°		73°		74°		75°		76°		77°		LHA														
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
0 180	0 00	18 00	90-0	0 00	17 00	90-0	0 00	16 00	90-0	0 00	15 00	90-0	0 00	14 00	90-0	0 00	13 00	90-0	0 00	12 00	90-0	0 00	11 00	90-0	0 00	10 00	180	360
1 179	0 19	18 00	89-0	0 18	17 00	89-0	0 17	16 00	89-0	0 16	15 00	89-0	0 15	14 00	89-0	0 15	13 00	89-0	0 13	12 00	89-0	0 13	11 00	89-0	0 13	10 00	181	359
2 178	0 37	17 59	88-1	0 35	16 59	88-1	0 33	15 59	88-1	0 31	14 59	88-1	0 29	14 00	88-1	0 29	13 00	88-1	0 27	12 00	88-1	0 27	11 00	88-1	0 27	10 00	182	358
3 177	0 56	17 59	87-1	0 53	16 59	87-1	0 50	15 59	87-1	0 47	14 59	87-1	0 44	13 59	87-1	0 44	12 59	87-1	0 40	11 59	87-1	0 40	10 59	87-1	0 40	9 00	183	357
4 176	1 14	17 58	86-2	1 10	16 58	86-2	1 06	15 58	86-2	1 02	14 58	86-1	0 58	13 58	86-1	0 58	12 58	86-1	0 54	11 58	86-1	0 54	10 58	86-1	0 54	9 00	184	356
5 175	1 33	17 56	85-2	1 28	16 56	85-2	1 23	15 57	85-2	1 18	14 57	85-2	1 12	13 57	85-1	1 12	12 57	85-1	1 07	11 57	85-1	1 07	10 57	85-1	1 07	9 00	185	355
6 174	1 51	17 54	84-3	1 45	16 55	84-3	1 39	15 55	84-2	1 33	14 55	84-2	1 27	13 56	84-2	1 27	12 56	84-2	1 21	11 56	84-2	1 21	10 56	84-2	1 21	9 00	186	354
7 173	2 09	17 52	83-3	2 03	16 53	83-3	1 56	15 53	83-3	1 48	14 54	83-2	1 41	13 54	83-2	1 41	12 54	83-2	1 34	11 54	83-2	1 34	10 54	83-2	1 34	9 00	187	353
8 172	2 28	17 50	82-4	2 20	16 51	82-3	2 12	15 51	82-3	2 04	14 52	82-3	1 56	13 52	82-2	1 56	12 53	82-2	1 48	11 53	82-2	1 48	10 53	82-2	1 48	9 00	188	352
9 171	2 46	17 48	81-4	2 37	16 48	81-4	2 28	15 49	81-3	2 19	14 49	81-3	2 10	13 50	81-3	2 10	12 51	81-2	2 01	11 51	81-2	2 01	10 51	81-2	2 01	9 00	189	351
10 170	3 05	17 45	80-5	2 55	16 45	80-4	2 45	15 46	80-4	2 35	14 47	80-3	2 24	13 48	80-3	2 24	12 49	80-3	2 14	11 49	80-3	2 14	10 49	80-3	2 14	9 00	190	350
11 169	3 23	17 41	79-5	3 12	16 42	79-5	3 01	15 43	79-4	2 50	14 44	79-4	2 39	13 45	79-3	2 39	12 46	79-3	2 28	11 46	79-3	2 28	10 46	79-3	2 28	9 00	191	349
12 168	3 41	17 38	78-6	3 29	16 39	78-5	3 17	15 40	78-5	3 05	14 41	78-4	2 53	13 42	78-3	2 53	12 44	78-3	2 41	11 44	78-3	2 41	10 44	78-3	2 41	9 00	192	348
13 167	3 59	17 34	77-6	3 46	16 35	77-5	3 33	15 37	77-5	3 20	14 38	77-4	3 07	13 39	77-4	3 07	12 41	77-3	2 54	11 41	77-3	2 54	10 41	77-3	2 54	9 00	193	347
14 166	4 17	17 30	76-7	4 03	16 31	76-6	3 49	15 33	76-5	3 35	14 34	76-5	3 21	13 36	76-4	3 21	12 38	76-3	3 07	11 38	76-3	3 07	10 38	76-3	3 07	9 00	194	346
15 165	4 35	17 25	75-7	4 20	16 27	75-6	4 05	15 29	75-6	3 50	14 31	75-5	3 35	13 32	75-4	3 35	12 34	75-4	3 20	11 34	75-4	3 20	10 34	75-4	3 20	9 00	195	345
16 164	4 53	17 21	74-7	4 37	16 23	74-7	4 21	15 25	74-6	4 05	14 27	74-5	3 49	13 29	74-5	3 49	12 31	74-4	3 33	11 31	74-4	3 33	10 31	74-4	3 33	9 00	196	344
17 163	5 11	17 16	73-8	4 54	16 18	73-7	4 37	15 20	73-6	4 20	14 22	73-5	4 03	13 25	73-5	4 03	12 27	73-4	3 46	11 27	73-4	3 46	10 27	73-4	3 46	9 00	197	343
18 162	5 29	17 10	72-8	5 11	16 13	72-7	4 53	15 15	72-7	4 35	14 18	72-6	4 17	13 20	72-5	4 17	12 23	72-4	3 59	11 23	72-4	3 59	10 23	72-4	3 59	9 00	198	342
19 161	5 46	17 05	71-9	5 28	16 07	71-8	5 09	15 10	71-7	4 50	14 13	71-6	4 31	13 16	71-5	4 31	12 19	71-5	4 25	11 19	71-5	4 25	10 19	71-5	4 25	9 00	199	341
20 160	6 04	16 59	70-9	5 44	16 02	70-8	5 25	15 05	70-7	5 05	14 08	70-6	4 45	13 11	70-5	4 45	12 14	70-5	4 37	11 14	70-5	4 37	10 14	70-5	4 37	9 00	200	340
21 159	6 21	16 52	69-9	6 01	15 56	69-8	5 40	14 59	69-7	5 19	14 03	69-7	4 58	13 06	69-6	4 58	12 10	69-5	4 50	11 10	69-5	4 50	10 10	69-5	4 50	9 00	201	339
22 158	6 39	16 46	69-0	6 17	15 50	68-9	5 56	14 53	68-8	5 34	13 57	68-7	5 12	13 01	68-6	5 12	12 05	68-5	5 03	11 05	68-5	5 03	10 05	68-5	5 03	9 00	202	338
23 157	6 56	16 39	68-0	6 34	15 43	67-9	6 11	14 47	67-8	5 48	13 51	67-7	5 25	12 56	67-6	5 25	12 00	67-5	5 03	11 00	67-5	5 03	10 00	67-5	5 03	9 00	203	337
24 156	7 13	16 32	67-1	6 50	15 36	66-9	6 26	14 41	66-8	6 03	13 45	66-7	5 39	12 50	66-6	5 39	11 55	66-5	5 15	10 55	66-5	5 15	09 55	66-5	5 15	9 00	204	336
25 155	7 30	16 25	66-1	7 06	15 29	66-0	6 41	14 34	65-9	6 17	13 39	65-8	5 52	12 44	65-7	5 52	11 49	65-6	5 27	10 49	65-6	5 27	09 49	65-6	5 27	9 00	205	335
26 154	7 47	16 17	65-1	7 22	15 22	65-0	6 56	14 27	64-9	6 31	13 32	64-8	6 05	12 38	64-7	6 05	11 43	64-6	5 40	10 43	64-6	5 40	09 43	64-6	5 40	9 00	206	334
27 153	8 04	16 09	64-1	7 38	15 14	64-0	7 11	14 20	63-9	6 45	13 26	63-8	6 18	12 32	63-7	6 18	11 37	63-6	5 52	10 37	63-6	5 52	09 37	63-6	5 52	9 00	207	333
28 152	8 20	16 00	63-2	7 53	15 06	63-0	7 26	14 12	62-9	6 59	13 19	62-8	6 31	12 25	62-7	6 31	11 31	62-6	6 04	10 31	62-6	6 04	09 31	62-6	6 04	9 00	208	332
29 151	8 37	15 52	62-2	8 09	14 58	62-1	7 41	14 05	61-9	7 13	13 11	61-8	6 44	12 18	61-7	6 44	11 25	61-6	6 16	10 25	61-6	6 16	09 25	61-6	6 16	9 00	209	331
30 150	8 53	15 43	61-2	8 24	14 50	61-1	7 55	13 57	61-0	7 26	13 04	60-9	6 57	12 11	60-7	6 57	11 18	60-6	6 27	10 18	60-6	6 27	09 18	60-6	6 27	9 00	210	330
31 149	9 09	15 34	60-3	8 40	14 41	60-1	8 10	13 49	60-0	7 40	12 56	59-9	7 09	12 04	59-8	7 09	11 12	59-7	6 39	10 12	59-7	6 39	09 12	59-7	6 39	9 00	211	329
32 148	9 25	15 24	59-3	8 55	14 32	59-1	8 24	13 40	59-0	7 53	12 48	58-9	7 22	11 56	58-8	7 22	11 05	58-7	6 51	10 15	58-7	6 51	09 15	58-7	6 51	9 00	212	328
33 147	9 41	15 15	58-3	9 10	14 23	58-2	8 38	13 31	58-0	8 06	12 40	57-9	7 34	11 49	57-8	7 34	10 57	57-7	7 02	10 07	57-7	7 02	09 07	57-7	7 02	9 00	213	327
34 146	9 57	15 05	57-3	9 25	14 13	57-2	8 52	13 22	57-0	8 19	12 31	56-9	7 46	11 41	56-8	7 46	10 50	56-7	7 14	10 00	56-7	7 14	09 00	56-7	7 14	9 00	214	326
35 145	10 13	14 54	56-3	9 39	14 04	56-2	9 06	13 13	56-1	8 32	12 23	55-9	7 59	11 33	55-8	7 59	10 43	55-7	7 25	09 43	55-7	7 25	08 43	55-7	7 25	9 00	215	325
36 144	10 28	14 44	55-4	9 54	13 54	55-2	9 19	13 04	55-1	8 45	12 14	54-9	8 11	11 24	54-8	8 11	10 35	54-7	7 36	09 35	54-7	7 36	08 35	54-7	7 36	9 00	216	324
37 143	10 43	14 33	5																									

Lat. / A		72°			73°			74°			75°			76°			77°			Lat. / A
LHA/F		A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45	135	12 37	12 56	46.4	11 56	12 12	46.3	11 14	11 28	46.1	10 33	10 44	46.0	9 51	10 00	45.9	9 09	9 16	45.7	225
46	134	12 51	12 43	45.4	12 08	11 59	45.3	11 26	11 16	45.1	10 44	10 33	45.0	10 01	9 50	44.9	9 19	9 07	44.7	315
47	133	13 04	12 30	44.4	12 21	11 47	44.3	11 38	11 04	44.1	10 55	10 21	44.0	10 11	9 39	43.9	9 28	8 57	43.7	226
48	132	13 17	12 16	43.4	12 33	11 34	43.3	11 49	10 52	43.1	11 05	10 10	43.0	10 21	9 28	42.9	9 37	8 47	42.7	313
49	131	13 29	12 02	42.4	12 45	11 21	42.3	12 00	10 39	42.1	11 16	9 58	42.0	10 31	9 17	41.9	9 46	8 37	41.7	228
50	130	13 42	11 48	41.4	12 57	11 07	41.3	12 11	10 27	41.1	11 26	9 46	41.0	10 41	9 06	40.9	9 55	8 26	40.7	312
51	129	13 54	11 33	40.4	13 08	10 53	40.3	12 22	10 14	40.1	11 36	9 34	40.0	10 50	8 55	39.8	10 04	8 16	39.7	230
52	128	14 06	11 19	39.4	13 19	10 40	39.2	12 33	10 01	39.1	11 46	9 22	39.0	10 59	8 44	38.8	10 13	8 05	38.7	309
53	127	14 17	11 04	38.4	13 30	10 26	38.2	12 43	9 47	38.1	11 56	9 10	38.0	11 08	8 32	37.8	10 21	7 55	37.7	232
54	126	14 29	10 49	37.4	13 41	10 11	37.2	12 53	9 34	37.1	12 05	8 57	36.9	11 17	8 20	36.8	10 29	7 44	37.6	308
55	125	14 40	10 33	36.4	13 51	9 57	36.2	13 03	9 20	36.1	12 14	8 44	35.9	11 26	8 08	35.8	10 37	7 33	35.7	234
56	124	14 51	10 18	35.3	14 02	9 42	35.2	13 13	9 07	35.1	12 23	8 31	34.9	11 34	7 56	34.8	10 45	7 21	34.7	306
57	123	15 01	10 02	34.3	14 12	9 27	34.2	13 22	8 53	34.0	12 32	8 18	33.9	11 42	7 44	33.8	10 52	7 10	33.7	237
58	122	15 12	9 46	33.3	14 21	9 12	33.2	13 31	8 38	33.0	12 41	8 05	32.9	11 50	7 32	32.8	11 00	6 58	32.7	303
59	121	15 22	9 30	32.3	14 31	8 57	33.1	13 40	8 24	32.0	12 49	7 51	31.9	11 58	7 19	31.8	11 07	6 47	31.7	238
60	120	15 31	9 14	31.3	14 40	8 41	31.1	13 49	8 10	31.0	12 57	7 38	30.9	12 06	7 06	30.8	11 14	6 35	30.6	239
61	119	15 41	8 57	30.2	14 49	8 26	30.1	13 57	7 55	30.0	13 05	7 24	29.8	12 13	6 54	29.7	11 21	6 23	29.6	240
62	118	15 50	8 40	29.2	14 58	8 10	29.1	14 05	7 40	28.9	13 13	7 10	28.8	12 20	6 41	28.7	11 27	6 11	28.6	241
63	117	15 59	8 23	28.2	15 06	7 54	28.0	14 13	7 25	27.9	13 20	6 56	27.8	12 27	6 27	27.7	11 34	5 59	27.6	298
64	116	16 08	8 06	27.2	15 14	7 38	27.0	14 21	7 10	26.9	13 27	6 42	26.8	12 34	6 14	26.7	11 40	5 47	26.6	243
65	115	16 16	7 49	26.1	15 22	7 22	26.0	14 28	6 55	25.9	13 34	6 28	25.8	12 40	6 01	25.7	11 46	5 34	25.6	296
66	114	16 24	7 32	25.1	15 29	7 05	25.0	14 35	6 39	24.9	13 41	6 13	24.7	12 46	5 47	24.6	11 52	5 22	24.6	245
67	113	16 32	7 14	24.1	15 37	6 49	23.9	14 42	6 24	23.8	13 47	5 59	23.7	12 52	5 34	23.6	11 57	5 09	23.5	294
68	112	16 39	6 56	23.0	15 44	6 32	22.9	14 48	6 08	22.8	13 53	5 44	22.7	12 58	5 20	22.6	12 02	4 57	22.5	247
69	111	16 46	6 38	22.0	15 50	6 15	21.9	14 55	5 52	21.8	13 59	5 29	21.7	13 03	5 06	21.6	12 07	4 44	21.5	293
70	110	16 53	6 20	20.9	15 57	5 58	20.8	15 01	5 36	20.7	14 05	5 14	20.6	13 08	4 52	20.5	12 12	4 31	20.5	248
71	109	16 59	6 02	19.9	16 03	5 41	19.8	15 06	5 20	19.7	14 10	4 59	19.6	13 13	4 38	19.5	12 17	4 18	19.5	291
72	108	17 05	5 44	18.9	16 09	5 24	18.8	15 12	5 04	18.7	14 15	4 44	18.6	13 18	4 24	18.5	12 21	4 05	18.4	250
73	107	17 11	5 26	17.8	16 14	5 06	17.7	15 17	4 48	17.6	14 20	4 29	17.6	13 23	4 10	17.5	12 25	3 52	17.4	288
74	106	17 17	5 07	16.8	16 19	4 49	16.7	15 22	4 31	16.6	14 24	4 13	16.5	13 27	3 56	16.5	12 29	3 38	16.4	253
75	105	17 22	4 48	15.7	16 24	4 31	15.7	15 26	4 15	15.6	14 29	3 58	15.5	13 31	3 42	15.4	12 33	3 25	15.4	286
76	104	17 27	4 30	14.7	16 29	4 14	14.6	15 31	3 58	14.5	14 33	3 43	14.5	13 35	3 27	14.4	12 36	3 12	14.4	255
77	103	17 31	4 11	13.6	16 33	3 56	13.6	15 35	3 41	13.5	14 36	3 27	13.4	13 38	3 13	13.4	12 40	2 58	13.3	285
78	102	17 36	3 52	12.6	16 37	3 38	12.5	15 38	3 25	12.5	14 40	3 11	12.4	13 41	2 58	12.4	12 43	2 45	12.3	257
79	101	17 39	3 33	11.6	16 41	3 20	11.5	15 42	3 08	11.4	14 43	2 56	11.4	13 44	2 43	11.3	12 45	2 31	11.3	282
80	100	17 43	3 14	10.5	16 44	3 02	10.4	15 45	2 51	10.4	14 46	2 40	10.3	13 47	2 29	10.3	12 48	2 18	10.3	259
81	99	17 46	2 55	9.5	16 47	2 44	9.4	15 48	2 34	9.4	14 49	2 24	9.3	13 49	2 14	9.3	12 50	2 04	9.2	280
82	98	17 49	2 35	8.4	16 50	2 26	8.4	15 50	2 17	8.3	14 51	2 08	8.3	13 52	1 59	8.2	12 52	1 50	8.2	261
83	97	17 52	2 16	7.4	16 52	2 08	7.3	15 53	2 00	7.3	14 53	1 56	7.2	13 54	1 44	7.2	12 54	1 37	7.2	279
84	96	17 54	1 57	6.3	16 54	1 50	6.3	15 55	1 43	6.2	14 55	1 36	6.2	13 55	1 30	6.2	12 56	1 23	6.2	278
85	95	17 56	1 37	5.3	16 56	1 32	5.2	15 56	1 26	5.2	14 56	1 20	5.2	13 57	1 15	5.2	12 57	1 09	5.1	277
86	94	17 57	1 18	4.2	16 57	1 13	4.2	15 58	1 09	4.2	14 58	1 04	4.1	13 58	1 00	4.1	12 58	0 55	4.1	266
87	93	17 58	0 58	3.2	16 59	0 55	3.1	15 59	0 52	3.1	14 59	0 48	3.1	13 59	0 45	3.1	12 59	0 42	3.1	274
88	92	17 59	0 39	2.1	16 59	0 37	2.1	15 59	0 34	2.1	14 59	0 32	2.1	13 59	0 30	2.1	13 00	0 28	2.1	273
89	91	18 00	0 19	1.1	17 00	0 18	1.0	16 00	0 17	1.0	15 00	0 16	1.0	14 00	0 15	1.0	13 00	0 14	1.0	267
90	90	18 00	0 00	0.0	17 00	0 00	0.0	16 00	0 00	0.0	15 00	0 00	0.0	14 00	0 00	0.0	13 00	0 00	0.0	272

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

B: (-) for 90° < LHA < 270° Dec: (-) for Lat. contrary name				Z ₁ : same sign as B Z ₂ : (-) for F > 90°			
78°				80°			
Lat. / A	LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂
0	180	0 00	12 00	90-0	0 00	10 00	90-0
1	179	0 12	12 00	89-0	0 10	10 00	89-0
2	178	0 25	12 00	88-0	0 21	10 00	88-0
3	177	0 37	11 59	87-1	0 31	9 59	87-0
4	176	0 50	11 58	86-1	0 42	9 59	86-1
5	175	1 02	11 57	85-1	0 52	9 58	85-1
6	174	1 15	11 56	84-1	1 02	9 57	84-1
7	173	1 27	11 55	83-2	1 13	9 56	83-1
8	172	1 39	11 53	82-2	1 23	9 54	82-1
9	171	1 52	11 51	81-2	1 33	9 53	81-1
10	170	2 04	11 49	80-2	1 44	9 51	80-1
11	169	2 16	11 47	79-2	1 54	9 49	79-1
12	168	2 29	11 45	78-3	2 04	9 47	78-2
13	167	2 41	11 42	77-3	2 14	9 45	77-2
14	166	2 53	11 39	76-3	2 24	9 43	76-2
15	165	3 05	11 36	75-3	2 35	9 40	75-2
16	164	3 17	11 33	74-3	2 45	9 37	74-2
17	163	3 29	11 29	73-4	2 55	9 34	73-2
18	162	3 41	11 26	72-4	3 05	9 31	72-3
19	161	3 53	11 22	71-4	3 14	9 28	71-3
20	160	4 05	11 18	70-4	3 24	9 24	70-3
21	159	4 16	11 13	69-4	3 34	9 21	69-3
22	158	4 28	11 09	68-4	3 44	9 17	68-3
23	157	4 40	11 04	67-5	3 53	9 13	67-3
24	156	4 51	10 59	66-5	4 03	9 09	66-3
25	155	5 02	10 54	65-5	4 13	9 05	65-3
26	154	5 14	10 49	64-5	4 22	9 00	64-3
27	153	5 25	10 43	63-5	4 31	8 56	63-4
28	152	5 36	10 38	62-5	4 41	8 51	62-4
29	151	5 47	10 32	61-5	4 50	8 46	61-4
30	150	5 58	10 26	60-5	4 59	8 41	60-4
31	149	6 09	10 20	59-6	5 08	8 36	59-4
32	148	6 20	10 13	58-6	5 17	8 30	58-4
33	147	6 30	10 06	57-6	5 26	8 25	57-4
34	146	6 41	10 00	56-6	5 34	8 19	56-4
35	145	6 51	9 53	55-6	5 43	8 13	55-4
36	144	7 01	9 45	54-6	5 51	8 07	54-4
37	143	7 11	9 38	53-6	6 00	8 01	53-4
38	142	7 21	9 31	52-6	6 08	7 55	52-4
39	141	7 31	9 23	51-6	6 16	7 48	51-4
40	140	7 41	9 15	50-6	6 25	7 42	50-4
41	139	7 50	9 07	49-6	6 32	7 35	49-4
42	138	8 00	8 59	48-6	6 40	7 28	48-4
43	137	8 09	8 50	47-6	6 48	7 21	47-4
44	136	8 18	8 42	46-6	6 56	7 14	46-4
45	135	8 27	8 33	45-6	7 03	7 06	45-4
79°				81°			
		A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂
		0 00	11 00	90-0	0 00	9 00	90-0
		0 11	11 00	89-0	0 09	9 00	89-0
		0 23	11 00	88-0	0 19	9 00	88-0
		0 34	10 59	87-1	0 28	8 59	87-0
		0 46	10 58	86-1	0 38	8 59	86-0
		0 57	10 58	85-1	0 47	8 58	85-1
		1 09	10 56	84-1	0 56	8 57	84-1
		1 20	10 55	83-1	1 06	8 56	83-1
		1 31	10 54	82-1	1 15	8 55	82-1
		1 43	10 52	81-2	1 24	8 53	81-1
		1 54	10 50	80-2	1 33	8 52	80-1
		2 05	10 48	79-2	1 43	8 50	79-1
		2 16	10 46	78-2	1 52	8 48	78-1
		2 28	10 43	77-2	2 01	8 46	77-2
		2 39	10 41	76-2	2 10	8 44	76-2
		2 50	10 38	75-3	2 19	8 42	75-2
		3 01	10 35	74-3	2 28	8 39	74-2
		3 12	10 32	73-3	2 37	8 37	73-2
		3 23	10 28	72-3	2 46	8 34	72-2
		3 34	10 25	71-3	2 55	8 31	71-2
		3 45	10 21	70-3	3 04	8 28	70-2
		3 55	10 17	69-4	3 13	8 25	69-2
		4 06	10 13	68-4	3 22	8 21	68-2
		4 17	10 09	67-4	3 30	8 18	67-3
		4 27	10 04	66-4	3 39	8 14	66-3
		4 38	9 59	65-4	3 47	8 10	65-3
		4 48	9 55	64-4	3 56	8 06	64-3
		4 58	9 50	63-4	4 04	8 02	63-3
		5 08	9 44	62-4	4 13	7 58	62-3
		5 18	9 39	61-4	4 21	7 53	61-3
		5 28	9 33	60-5	4 29	7 49	60-3
		5 38	9 28	59-5	4 37	7 44	59-3
		5 48	9 22	58-5	4 45	7 39	58-3
		5 58	9 16	57-5	4 53	7 34	57-3
		6 08	9 09	56-5	5 01	7 29	56-3
		6 17	9 03	55-5	5 09	7 24	55-3
		6 26	8 56	54-5	5 17	7 18	54-3
		6 36	8 49	53-5	5 24	7 13	53-3
		6 45	8 43	52-5	5 32	7 07	52-3
		6 54	8 35	51-5	5 39	7 01	51-3
		7 03	8 28	50-5	5 46	6 55	50-3
		7 11	8 21	49-5	5 53	6 49	49-4
		7 20	8 13	48-5	6 01	6 43	48-4
		7 29	8 05	47-5	6 07	6 36	47-4
		7 37	7 58	46-5	6 14	6 30	46-4
		7 45	7 50	45-5	6 21	6 23	45-4
82°				83°			
		A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂
		0 00	8 00	90-0	0 00	7 00	90-0
		0 08	8 00	89-0	0 07	7 00	89-0
		0 15	8 00	88-0	0 15	7 00	88-0
		0 25	7 59	87-0	0 22	6 59	87-0
		0 33	7 59	86-0	0 29	6 59	86-0
		0 42	7 58	85-0	0 37	6 58	85-0
		0 50	7 57	84-1	0 44	6 58	84-0
		0 58	7 56	83-1	0 51	6 57	83-1
		1 07	7 55	82-1	0 58	6 56	82-1
		1 15	7 54	81-1	1 06	6 55	81-1
		1 23	7 53	80-1	1 13	6 54	80-1
		1 31	7 51	79-1	1 20	6 52	79-1
		1 39	7 50	78-1	1 27	6 51	78-1
		1 48	7 48	77-1	1 34	6 49	77-1
		1 56	7 46	76-1	1 41	6 48	76-1
		2 04	7 44	75-1	1 48	6 46	75-1
		2 12	7 42	74-1	1 56	6 44	74-1
		2 20	7 39	73-2	2 03	6 42	73-1
		2 28	7 37	72-2	2 09	6 40	72-1
		2 36	7 34	71-2	2 16	6 37	71-1
		2 44	7 31	70-2	2 23	6 35	70-1
		2 52	7 28	69-2	2 30	6 32	69-1
		2 59	7 25	68-2	2 37	6 30	68-1
		3 07	7 22	67-2	2 44	6 27	67-2
		3 15	7 19	66-2	2 50	6 24	66-2
		3 22	7 16	65-2	2 57	6 21	65-2
		3 30	7 12	64-2	3 04	6 18	64-2
		3 37	7 08	63-2	3 10	6 15	63-2
		3 45	7 04	62-2	3 17	6 11	62-2
		3 52	7 00	61-2	3 23	6 08	61-2
		3 59	6 56	60-2	3 30	6 04	60-2
		4 07	6 52	59-2	3 36	6 00	59-2
		4 14	6 48	58-3	3 42	5 57	58-2
		4 21	6 43	57-3	3 48	5 53	57-2
		4 28	6 39	56-3	3 54	5 49	56-2
		4 35	6 34	55-3	4 00	5 45	55-2
		4 42	6 29	54-3	4 06	5 40	54-2
		4 48	6 24	53-3	4 12	5 36	53-2
		4 55	6 19	52-3	4 18	5 32	52-2
		5 01	6 14	51-3	4 24	5 27	51-2
		5 08	6 09	50-3	4 30	5 22	50-2
		5 14	6 03	49-3	4 35	5 18	49-2
		5 21	5 58	48-3	4 41	5 13	48-2
		5 27	5 52	47-3	4 46	5 08	47-2
		5 33	5 46	46-3	4 51	5 03	46-2
		5 39	5 41	45-3	4 57	4 58	45-2

Lat. / A	78°			79°			80°			81°			82°			83°			Lat. / A	
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA	
45	135	8 27	8 33	45-6	7 45	7 50	45-5	7 03	7 06	45-4	6 21	6 23	45-4	5 39	5 41	45-3	4 57	4 58	45-2	225
46	134	8 36	8 24	44-6	7 53	7 41	44-5	7 11	6 59	44-4	6 28	6 17	44-4	5 45	5 35	44-3	5 02	4 53	44-2	226
47	133	8 45	8 15	43-6	8 01	7 33	43-5	7 18	6 51	43-4	6 34	6 10	43-4	5 51	5 28	43-3	5 07	4 47	43-2	227
48	132	8 53	8 06	42-6	8 09	7 25	42-5	7 25	6 44	42-4	6 41	6 03	42-4	5 56	5 22	42-3	5 12	4 42	42-2	228
49	131	9 02	7 56	41-6	8 17	7 16	41-5	7 32	6 36	41-4	6 47	5 56	41-4	6 02	5 16	41-3	5 17	4 36	41-2	229
50	130	9 10	7 47	40-6	8 24	7 07	40-5	7 39	6 28	40-4	6 53	5 49	40-3	6 07	5 10	40-3	5 21	4 31	40-2	230
51	129	9 18	7 37	39-6	8 32	6 58	39-5	7 45	6 20	39-4	6 59	5 42	39-3	6 13	5 03	39-3	5 26	4 25	39-2	231
52	128	9 26	7 27	38-6	8 39	6 49	38-5	7 52	6 12	38-4	7 05	5 34	38-3	6 18	4 57	38-3	5 31	4 19	38-2	232
53	127	9 33	7 17	37-6	8 46	6 40	37-5	7 58	6 03	37-4	7 11	5 27	37-3	6 23	4 50	37-3	5 35	4 14	37-2	233
54	126	9 41	7 07	36-6	8 53	6 31	36-5	8 05	5 55	36-4	7 16	5 19	36-3	6 28	4 43	36-3	5 39	4 08	36-2	234
55	125	9 48	6 57	35-6	9 00	6 22	35-5	8 11	5 47	35-4	7 22	5 11	35-3	6 33	4 37	35-3	5 44	4 02	35-2	235
56	124	9 56	6 47	34-6	9 06	6 12	34-5	8 17	5 38	34-4	7 27	5 04	34-3	6 38	4 30	34-3	5 48	3 56	34-2	236
57	123	10 03	6 36	33-6	9 13	6 03	33-5	8 22	5 29	33-4	7 32	4 56	33-3	6 42	4 23	33-3	5 52	3 50	33-2	237
58	122	10 09	6 26	32-6	9 19	5 53	32-5	8 28	5 20	32-4	7 37	4 48	32-3	6 47	4 16	32-3	5 56	3 43	32-2	238
59	121	10 16	6 15	31-6	9 25	5 43	31-5	8 34	5 11	31-4	7 42	4 40	31-3	6 51	4 08	31-2	6 00	3 37	31-2	239
60	120	10 22	6 04	30-6	9 31	5 33	30-5	8 39	5 02	30-4	7 47	4 32	30-3	6 55	4 01	30-2	6 04	3 31	30-2	240
61	119	10 29	5 53	29-5	9 36	5 23	29-5	8 44	4 53	29-4	7 52	4 23	29-3	6 59	3 54	29-2	6 07	3 24	29-2	241
62	118	10 35	5 42	28-5	9 42	5 13	28-4	8 49	4 44	28-4	7 56	4 15	28-3	7 04	3 46	28-2	6 11	3 18	28-2	242
63	117	10 41	5 31	27-5	9 47	5 03	27-4	8 54	4 35	27-4	8 01	4 07	27-3	7 07	3 39	27-2	6 14	3 11	27-2	243
64	116	10 46	5 19	26-5	9 52	4 52	26-4	8 59	4 25	26-3	8 05	3 58	26-3	7 11	3 32	26-2	6 17	3 05	26-2	244
65	115	10 52	5 08	25-5	9 57	4 42	25-4	9 03	4 16	25-3	8 09	3 50	25-3	7 15	3 24	25-2	6 20	2 58	25-2	245
66	114	10 57	4 56	24-5	10 02	4 31	24-4	9 08	4 06	24-3	8 13	3 41	24-3	7 18	3 16	24-2	6 24	2 52	24-2	246
67	113	11 02	4 45	23-5	10 07	4 21	23-4	9 12	3 56	23-3	8 17	3 32	23-3	7 22	3 09	23-2	6 26	2 45	23-2	247
68	112	11 07	4 33	22-4	10 11	4 10	22-4	9 16	3 47	22-3	8 20	3 24	22-2	7 25	3 01	22-2	6 29	2 38	22-1	248
69	111	11 12	4 21	21-4	10 16	3 59	21-4	9 20	3 37	21-3	8 24	3 15	21-2	7 28	2 53	21-2	6 32	2 31	21-1	249
70	110	11 16	4 09	20-4	10 20	3 48	20-3	9 23	3 27	20-3	8 27	3 06	20-2	7 31	2 45	20-2	6 35	2 24	20-1	250
71	109	11 20	3 58	19-4	10 24	3 37	19-3	9 27	3 17	19-3	8 30	2 57	19-2	7 34	2 37	19-2	6 37	2 17	19-1	251
72	108	11 24	3 45	18-4	10 27	3 26	18-3	9 30	3 07	18-3	8 33	2 48	18-2	7 36	2 29	18-2	6 39	2 10	18-1	252
73	107	11 28	3 33	17-4	10 31	3 15	17-3	9 34	2 57	17-2	8 36	2 39	17-2	7 39	2 21	17-2	6 42	2 03	17-1	253
74	106	11 32	3 21	16-3	10 34	3 04	16-3	9 37	2 47	16-2	8 39	2 30	16-2	7 41	2 13	16-1	6 44	1 56	16-1	254
75	105	11 35	3 09	15-3	10 37	2 53	15-3	9 39	2 37	15-2	8 41	2 21	15-2	7 44	2 05	15-1	6 46	1 49	15-1	255
76	104	11 38	2 57	14-3	10 40	2 42	14-3	9 42	2 27	14-2	8 44	2 12	14-2	7 46	1 57	14-1	6 47	1 42	14-1	256
77	103	11 41	2 44	13-3	10 43	2 30	13-2	9 44	2 16	13-2	8 46	2 02	13-2	7 48	1 49	13-1	6 49	1 35	13-1	257
78	102	11 44	2 32	12-3	10 45	2 19	12-2	9 47	2 06	12-2	8 48	1 53	12-1	7 49	1 40	12-1	6 51	1 28	12-1	258
79	101	11 47	2 19	11-2	10 48	2 07	11-2	9 49	1 56	11-2	8 50	1 44	11-1	7 51	1 32	11-1	6 52	1 21	11-1	259
80	100	11 49	2 07	10-2	10 50	1 56	10-2	9 51	1 45	10-2	8 52	1 35	10-1	7 53	1 24	10-1	6 54	1 13	10-1	260
81	99	11 51	1 54	9-2	10 52	1 45	9-2	9 53	1 35	9-1	8 53	1 25	9-1	7 54	1 16	9-1	6 55	1 06	9-1	261
82	98	11 53	1 42	8-2	10 53	1 33	8-1	9 54	1 24	8-1	8 55	1 16	8-1	7 55	1 07	8-1	6 56	0 59	8-1	262
83	97	11 55	1 29	7-2	10 55	1 21	7-1	9 55	1 14	7-1	8 56	1 06	7-1	7 56	0 59	7-1	6 57	0 51	7-1	263
84	96	11 56	1 16	6-1	10 56	1 10	6-1	9 57	1 03	6-1	8 57	0 57	6-1	7 57	0 50	6-1	6 58	0 44	6-0	264
85	95	11 57	1 04	5-1	10 57	0 58	5-1	9 58	0 53	5-1	8 58	0 47	5-1	7 58	0 42	5-0	6 58	0 37	5-0	265
86	94	11 58	0 51	4-1	10 58	0 47	4-1	9 59	0 42	4-1	8 59	0 38	4-0	7 59	0 34	4-0	6 59	0 29	4-0	266
87	93	11 59	0 38	3-1	10 59	0 35	3-1	9 59	0 32	3-0	8 59	0 28	3-0	7 59	0 25	3-0	6 59	0 22	3-0	267
88	92	12 00	0 26	2-0	11 00	0 23	2-0	10 00	0 21	2-0	9 00	0 19	2-0	8 00	0 17	2-0	7 00	0 15	2-0	268
89	91	12 00	0 13	1-0	11 00	0 12	1-0	10 00	0 11	1-0	9 00	0 10	1-0	8 00	0 08	1-0	7 00	0 07	1-0	269
90	90	12 00	0 00	0-0	11 00	0 00	0-0	10 00	0 00	0-0	9 00	0 00	0-0	8 00	0 00	0-0	7 00	0 00	0-0	270

N. Lat. for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

SIGHT REDUCTION TABLE

B: (—) for 90° < LHA < 270°
Dec: (—) for Lat. contrary name

Z₁: same sign as B
Z₂: (—) for F > 90°

84°		85°		86°		87°		88°		89°		Lat. / A
A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
0 180	6 00	90-0	0 00	5 00	90-0	0 00	4 00	90-0	0 00	2 00	90-0	180
1 179	0 06	89-0	0 05	5 00	89-0	0 04	4 00	89-0	0 02	2 00	89-0	360
2 178	0 13	88-0	0 10	5 00	88-0	0 08	4 00	88-0	0 06	2 00	88-0	181
3 177	0 19	87-0	0 16	5 00	87-0	0 13	4 00	87-0	0 09	2 00	87-0	359
4 176	0 25	86-0	0 21	4 59	86-0	0 17	3 59	86-0	0 13	2 00	86-0	183
5 175	0 31	85-0	0 26	4 59	85-0	0 21	3 59	85-0	0 16	2 00	85-0	357
6 174	0 38	84-0	0 31	4 58	84-0	0 25	3 59	84-0	0 19	2 59	84-0	184
7 173	0 44	83-0	0 37	4 58	83-0	0 29	3 58	83-0	0 22	2 59	83-0	356
8 172	0 50	82-0	0 42	4 57	82-0	0 33	3 58	82-0	0 25	2 58	82-0	186
9 171	0 56	81-0	0 47	4 56	81-0	0 38	3 57	81-0	0 28	2 58	81-0	353
10 170	1 02	80-0	0 52	4 55	80-0	0 42	3 56	80-0	0 31	2 57	80-0	188
11 169	1 09	79-0	0 57	4 55	79-0	0 46	3 56	79-0	0 34	2 57	79-0	351
12 168	1 15	78-0	1 02	4 53	78-0	0 50	3 55	78-0	0 37	2 56	78-0	190
13 167	1 21	77-0	1 07	4 52	77-0	0 54	3 54	77-0	0 40	2 55	77-0	349
14 166	1 27	76-0	1 12	4 51	76-0	0 58	3 53	76-0	0 44	2 55	76-0	192
15 165	1 33	75-0	1 18	4 50	75-0	1 02	3 52	75-0	0 47	2 54	75-0	347
16 164	1 39	74-0	1 23	4 48	74-0	1 06	3 51	74-0	0 50	2 53	74-0	194
17 163	1 45	73-0	1 28	4 47	73-0	1 10	3 50	73-0	0 53	2 52	73-0	346
18 162	1 51	72-0	1 33	4 45	72-0	1 14	3 48	72-0	0 56	2 51	72-0	196
19 161	1 57	71-0	1 38	4 44	71-0	1 18	3 47	71-0	0 59	2 50	71-0	343
20 160	2 03	70-0	1 42	4 42	70-0	1 22	3 46	70-0	1 02	2 49	70-0	198
21 159	2 09	69-0	1 47	4 40	69-0	1 26	3 44	69-0	1 04	2 48	69-0	342
22 158	2 15	68-0	1 52	4 38	68-0	1 30	3 43	68-0	1 07	2 47	68-0	199
23 157	2 20	67-0	1 57	4 36	67-0	1 34	3 41	67-0	1 10	2 46	67-0	340
24 156	2 26	66-0	2 02	4 34	66-0	1 38	3 39	66-0	1 13	2 44	66-0	200
25 155	2 32	65-0	2 07	4 32	65-0	1 41	3 38	65-0	1 16	2 43	65-0	339
26 154	2 38	64-0	2 11	4 30	64-0	1 45	3 36	64-0	1 19	2 42	64-0	204
27 153	2 43	63-0	2 16	4 27	63-0	1 49	3 34	63-0	1 22	2 40	63-0	336
28 152	2 49	62-0	2 21	4 25	62-0	1 53	3 32	62-0	1 24	2 39	62-0	206
29 151	2 54	61-0	2 25	4 23	61-0	1 56	3 30	61-0	1 27	2 37	61-0	333
30 150	3 00	60-0	2 30	4 20	60-0	2 00	3 28	60-0	1 30	2 36	60-0	208
31 149	3 05	59-0	2 34	4 17	59-0	2 04	3 26	59-0	1 33	2 34	59-0	332
32 148	3 11	58-0	2 39	4 15	58-0	2 07	3 24	58-0	1 35	2 33	58-0	209
33 147	3 16	57-0	2 43	4 12	57-0	2 11	3 21	57-0	1 38	2 31	57-0	330
34 146	3 21	56-0	2 48	4 09	56-0	2 14	3 19	56-0	1 41	2 29	56-0	210
35 145	3 26	55-0	2 52	4 06	55-0	2 18	3 17	55-0	1 43	2 27	55-0	329
36 144	3 31	54-0	2 56	4 03	54-0	2 21	3 14	54-0	1 46	2 26	54-0	211
37 143	3 36	53-0	3 00	4 00	53-0	2 24	3 12	53-0	1 48	2 24	53-0	328
38 142	3 41	52-0	3 05	3 57	52-0	2 28	3 09	52-0	1 51	2 22	52-0	212
39 141	3 46	51-0	3 09	3 53	51-0	2 31	3 07	51-0	1 53	2 20	51-0	327
40 140	3 51	50-0	3 13	3 50	50-0	2 34	3 04	50-0	1 56	2 18	50-0	213
41 139	3 56	49-0	3 17	3 47	49-0	2 37	3 01	49-0	1 58	2 16	49-0	326
42 138	4 01	48-0	3 21	3 43	48-0	2 41	2 58	48-0	2 00	2 14	48-0	214
43 137	4 05	47-0	3 24	3 40	47-0	2 44	2 56	47-0	2 03	2 12	47-0	325
44 136	4 10	46-0	3 28	3 36	46-0	2 47	2 53	46-0	2 05	2 10	46-0	215
45 135	4 14	45-0	3 32	3 32	45-0	2 50	2 50	45-0	2 07	2 07	45-0	324

Lat. / A	84°			85°			86°			87°			88°			89°			Lat. / A
LHA/F	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	A/H	B/P	Z ₁ /Z ₂	LHA
45° 135	4 14	4 15	45.2	3 32	3 32	45.1	2 50	2 50	45.1	2 07	2 07	45.0	1 25	1 25	45.0	0 42	0 42	45.0	225° 315
46° 134	4 19	4 11	44.2	3 36	3 29	44.1	2 53	2 47	44.1	2 09	2 05	44.0	1 26	1 23	44.0	0 43	0 42	44.0	226° 314
47° 133	4 23	4 06	43.2	3 39	3 25	43.1	2 55	2 44	43.1	2 12	2 03	43.0	1 28	1 22	43.0	0 44	0 41	43.0	227° 313
48° 132	4 27	4 01	42.2	3 43	3 21	42.1	2 58	2 41	42.1	2 14	2 01	42.0	1 29	1 20	42.0	0 45	0 40	42.0	228° 312
49° 131	4 31	3 57	41.2	3 46	3 17	41.1	3 01	2 38	41.1	2 16	1 58	41.0	1 31	1 19	41.0	0 45	0 39	41.0	229° 311
50° 130	4 36	3 52	40.2	3 50	3 13	40.1	3 04	2 34	40.1	2 18	1 56	40.0	1 32	1 17	40.0	0 46	0 39	40.0	230° 310
51° 129	4 40	3 47	39.2	3 53	3 09	39.1	3 06	2 31	39.1	2 20	1 53	39.0	1 33	1 16	39.0	0 47	0 38	39.0	231° 309
52° 128	4 43	3 42	38.2	3 56	3 05	38.1	3 09	2 28	38.1	2 22	1 51	38.0	1 35	1 14	38.0	0 47	0 37	38.0	232° 308
53° 127	4 47	3 37	37.2	3 59	3 01	37.1	3 12	2 25	37.1	2 24	1 48	37.0	1 36	1 12	37.0	0 48	0 36	37.0	233° 307
54° 126	4 51	3 32	36.1	4 03	2 57	36.1	3 14	2 21	36.1	2 26	1 46	36.0	1 37	1 11	36.0	0 49	0 35	36.0	234° 306
55° 125	4 55	3 27	35.1	4 06	2 52	35.1	3 17	2 18	35.1	2 27	1 43	35.0	1 38	1 09	35.0	0 49	0 34	35.0	235° 305
56° 124	4 58	3 22	34.1	4 09	2 48	34.1	3 19	2 14	34.1	2 29	1 41	34.0	1 39	1 07	34.0	0 50	0 34	34.0	236° 304
57° 123	5 02	3 17	33.1	4 12	2 44	33.1	3 21	2 11	33.1	2 31	1 38	33.0	1 41	1 05	33.0	0 50	0 33	33.0	237° 303
58° 122	5 05	3 11	32.1	4 14	2 39	32.1	3 23	2 07	32.1	2 33	1 35	32.0	1 42	1 04	32.0	0 51	0 32	32.0	238° 302
59° 121	5 08	3 06	31.1	4 17	2 35	31.1	3 26	2 04	31.1	2 34	1 33	31.0	1 43	1 02	31.0	0 51	0 31	31.0	239° 301
60° 120	5 12	3 00	30.1	4 20	2 30	30.1	3 28	2 00	30.1	2 36	1 30	30.0	1 44	1 00	30.0	0 52	0 30	30.0	240° 300
61° 119	5 15	2 55	29.1	4 22	2 26	29.1	3 30	1 56	29.1	2 37	1 27	29.0	1 45	0 58	29.0	0 52	0 29	29.0	241° 299
62° 118	5 18	2 49	28.1	4 25	2 21	28.1	3 32	1 53	28.1	2 39	1 25	28.0	1 46	0 56	28.0	0 53	0 28	28.0	242° 298
63° 117	5 21	2 44	27.1	4 27	2 16	27.1	3 34	1 49	27.1	2 40	1 22	27.0	1 47	0 54	27.0	0 53	0 27	27.0	243° 297
64° 116	5 23	2 38	26.1	4 30	2 12	26.1	3 36	1 45	26.1	2 42	1 19	26.0	1 48	0 53	26.0	0 54	0 26	26.0	244° 296
65° 115	5 26	2 35	25.1	4 32	2 07	25.1	3 37	1 42	25.1	2 43	1 16	25.0	1 49	0 51	25.0	0 54	0 25	25.0	245° 295
66° 114	5 29	2 27	24.1	4 34	2 02	24.1	3 39	1 38	24.1	2 44	1 13	24.0	1 50	0 49	24.0	0 55	0 24	24.0	246° 294
67° 113	5 31	2 21	23.1	4 36	1 57	23.1	3 41	1 34	23.1	2 46	1 10	23.0	1 50	0 47	23.0	0 55	0 23	23.0	247° 293
68° 112	5 34	2 15	22.1	4 38	1 53	22.1	3 42	1 30	22.0	2 47	1 07	22.0	1 51	0 45	22.0	0 56	0 22	22.0	248° 292
69° 111	5 36	2 09	21.1	4 40	1 48	21.1	3 44	1 26	21.0	2 48	1 05	21.0	1 52	0 43	21.0	0 56	0 22	21.0	249° 291
70° 110	5 38	2 04	20.1	4 42	1 43	20.1	3 46	1 22	20.0	2 49	1 02	20.0	1 53	0 41	20.0	0 56	0 21	20.0	250° 290
71° 109	5 40	1 58	19.1	4 44	1 38	19.1	3 47	1 18	19.0	2 50	0 59	19.0	1 53	0 39	19.0	0 57	0 20	19.0	251° 289
72° 108	5 42	1 52	18.1	4 45	1 33	18.1	3 48	1 14	18.0	2 51	0 56	18.0	1 54	0 37	18.0	0 57	0 19	18.0	252° 288
73° 107	5 44	1 46	17.1	4 47	1 28	17.1	3 49	1 10	17.0	2 52	0 53	17.0	1 55	0 35	17.0	0 57	0 18	17.0	253° 287
74° 106	5 46	1 40	16.1	4 48	1 23	16.1	3 51	1 06	16.0	2 53	0 50	16.0	1 55	0 33	16.0	0 58	0 17	16.0	254° 286
75° 105	5 48	1 33	15.1	4 50	1 18	15.1	3 52	1 02	15.0	2 54	0 47	15.0	1 56	0 31	15.0	0 58	0 16	15.0	255° 285
76° 104	5 49	1 27	14.1	4 51	1 13	14.1	3 53	0 58	14.0	2 55	0 44	14.0	1 56	0 29	14.0	0 58	0 15	14.0	256° 284
77° 103	5 51	1 21	13.1	4 52	1 08	13.0	3 54	0 54	13.0	2 55	0 41	13.0	1 57	0 27	13.0	0 58	0 13	13.0	257° 283
78° 102	5 52	1 15	12.1	4 53	1 03	12.0	3 55	0 50	12.0	2 56	0 37	12.0	1 57	0 25	12.0	0 59	0 12	12.0	258° 282
79° 101	5 53	1 09	11.1	4 54	0 57	11.0	3 56	0 46	11.0	2 57	0 34	11.0	1 58	0 23	11.0	0 59	0 11	11.0	259° 281
80° 100	5 55	1 03	10.1	4 55	0 52	10.0	3 56	0 42	10.0	2 57	0 31	10.0	1 58	0 21	10.0	0 59	0 10	10.0	260° 280
81° 99	5 56	0 57	9.0	4 56	0 47	9.0	3 57	0 38	9.0	2 58	0 28	9.0	1 59	0 19	9.0	0 59	0 09	9.0	261° 279
82° 98	5 56	0 50	8.0	4 57	0 42	8.0	3 58	0 33	8.0	2 58	0 25	8.0	1 59	0 17	8.0	0 59	0 08	8.0	262° 278
83° 97	5 57	0 44	7.0	4 58	0 37	7.0	3 58	0 29	7.0	2 59	0 22	7.0	1 59	0 15	7.0	1 00	0 07	7.0	263° 277
84° 96	5 58	0 38	6.0	4 58	0 31	6.0	3 59	0 25	6.0	2 59	0 19	6.0	1 59	0 13	6.0	1 00	0 06	6.0	264° 276
85° 95	5 59	0 31	5.0	4 59	0 26	5.0	3 59	0 21	5.0	2 59	0 16	5.0	2 00	0 10	5.0	1 00	0 05	5.0	265° 275
86° 94	5 59	0 25	4.0	4 59	0 21	4.0	3 59	0 17	4.0	3 00	0 13	4.0	2 00	0 08	4.0	1 00	0 04	4.0	266° 274
87° 93	6 00	0 19	3.0	5 00	0 16	3.0	4 00	0 13	3.0	3 00	0 09	3.0	2 00	0 06	3.0	1 00	0 03	3.0	267° 273
88° 92	6 00	0 13	2.0	5 00	0 10	2.0	4 00	0 08	2.0	3 00	0 06	2.0	2 00	0 04	2.0	1 00	0 02	2.0	268° 272
89° 91	6 00	0 06	1.0	5 00	0 05	1.0	4 00	0 04	1.0	3 00	0 03	1.0	2 00	0 02	1.0	1 00	0 01	1.0	269° 271
90° 90	6 00	0 00	0.0	5 00	0 00	0.0	4 00	0 00	0.0	3 00	0 00	0.0	2 00	0 00	0.0	1 00	0 00	0.0	270° 270

N. Lat.: for LHA > 180° ... Z_n = Z
for LHA < 180° ... Z_n = 360° - Z

S. Lat.: for LHA > 180° ... Z_n = 180° - Z
for LHA < 180° ... Z_n = 180° + Z

AUXILIARY TABLE

Sign of $corr_1$ for F' . Reverse sign if $F > 90^\circ$.
↓

Sign for $corr_2$ for A' .
↓

F'	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	$-A'$ + A'
P°	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	Z_2°
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
31	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	59
32	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	14	14	15	15	16	58
33	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	14	15	15	16	16	57
34	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	14	15	15	16	17	56
35	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	14	15	15	16	17	55
36	1	1	2	2	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	14	14	15	15	16	17	18	54
37	1	1	2	2	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	18	53
38	1	1	2	2	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	13	14	14	15	15	16	17	18	18	52
39	1	1	2	2	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	13	14	14	15	15	16	17	18	19	51
40	1	1	2	2	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	13	14	15	15	16	17	18	19	19	50

$F^+ -$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	$-A$
P°	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	Z_2^2
41	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20	49
42	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	11	12	13	13	14	15	15	16	17	17	18	19	20	48
43	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20	47
44	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	13	13	14	15	15	16	17	17	18	19	20	21	46
45	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13	14	15	16	16	17	18	19	20	21	21	45
46	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	12	12	13	14	15	16	17	17	18	19	19	20	21	22	44
47	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	13	14	15	16	17	18	18	19	20	20	21	22	43
48	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	13	14	15	16	17	18	19	19	20	20	21	22	42
49	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	20	20	21	22	23	41
50	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	14	15	16	17	18	19	20	21	21	22	23	40
51	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	23	39
52	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24	38
53	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	37
54	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	36
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58	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	32
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61	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	29
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63	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	27
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65	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	25
66	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	24
67	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	23
68	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	22
69	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	21
70	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	20
71	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	19
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73	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	17
74	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	16
75	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	15
76	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	14
77	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	13
78	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	12
79	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	11
80	1	2	3	3	3	4	5	5	6	7	7	8	9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	10

For $P > 80^\circ$, use 80°

For $Z_2 < 10^\circ$, use 10°

USE OF CONCISE SIGHT REDUCTION TABLES (continued)

4. *Example.* (b) Required the altitude and azimuth of *Vega* on 2023 July 29 at UT 04^h 50^m from the estimated position S 15°, W 152°.

1. Assumed latitude $Lat = 15^\circ S$
 From the almanac $GHA = 99^\circ 39'$
 Assumed longitude $151^\circ 39' W$
 Local hour angle $LHA = 308$
2. Reduction table, 1st entry
 $(Lat, LHA) = (15, 308)$ $A = 49 \ 34$ $A^\circ = 50, A' = 34$
 $B = +66 \ 29$ $Z_1 = +71.7,$ $LHA > 270^\circ$
3. From the almanac $Dec = -38 \ 48$ Lat and Dec contrary
 Sum = $B + Dec$ $F = +27 \ 41$ $F^\circ = 28, F' = 41$
4. Reduction table, 2nd entry
 $(A^\circ, F^\circ) = (50, 28)$ $H = 17 \ 34$ $P^\circ = 37$
 $Z_2 = 67.8, Z_2^\circ = 68$
5. Auxiliary table, 1st entry
 $(F', P^\circ) = (41, 37)$ $corr_1 = \frac{-11}{17 \ 23}$ $F < 90^\circ, F' > 29'$
 Sum
6. Auxiliary table, 2nd entry
 $(A', Z_2^\circ) = (34, 68)$ $corr_2 = \frac{+10}{17 \ 23}$ $A' > 30'$
7. Sum = computed altitude $H_C = +17^\circ 33'$ $F > 0^\circ$
8. Azimuth, first component $Z_1 = +71.7$ same sign as B
 second component $Z_2 = +67.8$ $F < 90^\circ, F > 0^\circ$
 Sum = azimuth angle $Z = 139.5$
 True azimuth $Z_n = 040^\circ$ $S Lat, LHA > 180^\circ$

5. *Form for use with the Concise Sight Reduction Tables.* The form on the following page lays out the procedure explained on pages 284-285. Each step is shown, with notes and rules to ensure accuracy, rather than speed, throughout the calculation. The form is mainly intended for the calculation of star positions. It therefore includes the formation of the Greenwich hour of Aries (GHA Aries), and thus the Greenwich hour angle of the star (GHA) from its tabular sidereal hour angle (SHA). These calculations, included in step 1 of the form, can easily be replaced by the interpolation of GHA and Dec for the Sun, Moon or planets.

The form may be freely copied; however, acknowledgement of the source is requested.

Date & UT of observation	Body	Estimated Latitude & Longitude
h m s		° ' "
Step	Calculate Altitude & Azimuth	Summary of Rules & Notes
Assumed latitude	$Lat = \quad^\circ$	Nearest estimated latitude, integral number of degrees.
Assumed longitude	$Long = \quad^\circ \quad'$	Choose <i>Long</i> so that <i>LHA</i> has integral number of degrees.
1. From the almanac:	$Dec = \quad^\circ \quad'$	Record the <i>Dec</i> for use in Step 3.
<i>GHA</i> Aries h	$= \quad^\circ \quad'$	Needed if using <i>SHA</i> . Tabular value for minutes and seconds of time.
Increment m s	$= \quad^\circ \quad'$	
<i>SHA</i>	$SHA = \quad^\circ \quad'$	
$GHA = GHA \text{ Aries} + SHA$	$GHA = \quad^\circ \quad'$	Remove multiples of 360° .
Assumed longitude	$Long = \quad^\circ \quad'$	West longitudes are negative.
$LHA = GHA + Long$	$LHA = \quad^\circ$	Remove multiples of 360° .
2. Reduction table, 1 st entry (<i>Lat</i> , <i>LHA</i>) = ($\quad^\circ$, $\quad^\circ$) record <i>A</i> , <i>B</i> and <i>Z</i> ₁ .	$A = \quad^\circ \quad' \quad A^\circ = \quad^\circ$ $A' = \quad'$ $B = \quad^\circ \quad' \quad Z_1 = \quad^\circ$	nearest whole degree of <i>A</i> . minutes part of <i>A</i> . <i>B</i> is minus if $90^\circ < LHA < 270^\circ$. <i>Z</i> ₁ has the same sign as <i>B</i> .
3. From step 1 $F = B + Dec$	$Dec = \quad^\circ \quad' \quad F = \quad^\circ \quad' \quad F^\circ = \quad^\circ \quad F' = \quad'$	<i>Dec</i> is minus if contrary to <i>Lat</i> . Regard <i>F</i> as positive until step 7. nearest whole degree of <i>F</i> . minutes part of <i>F</i> .
4. Reduction table, 2 nd entry (<i>A</i> [°] , <i>F</i> [°]) = ($\quad^\circ$, $\quad^\circ$) record <i>H</i> , <i>P</i> and <i>Z</i> ₂ .	$H = \quad^\circ \quad' \quad P^\circ = \quad^\circ \quad Z_2 = \quad^\circ$	nearest whole degree of <i>P</i> .
5. Auxiliary table, 1 st entry (<i>F</i> ['] , <i>P</i> [°]) = ($\quad'$, $\quad^\circ$) record <i>corr</i> ₁	$corr_1 = \quad'$	<i>corr</i> ₁ is minus if $F < 90^\circ$ & $F' > 29'$, or if $F > 90^\circ$ & $F' < 30'$.
6. Auxiliary table, 2 nd entry (<i>A</i> ['] , <i>Z</i> ₂ [°]) = ($\quad'$, $\quad^\circ$) record <i>corr</i> ₂	$corr_2 = \quad'$	<i>Z</i> ₂ [°] nearest whole degree of <i>Z</i> ₂ . <i>corr</i> ₂ is minus if $A' < 30'$.
7. Calculated altitude = $H_C = H + corr_1 + corr_2$	$H_C = \quad^\circ \quad'$	<i>H</i> _C is minus if <i>F</i> is negative, and object is below the horizon.
8. Azimuth, 1 st component 2 nd component $Z = Z_1 + Z_2$ True azimuth	$Z_1 = \quad^\circ$ $Z_2 = \quad^\circ$ $Z = \quad^\circ$ $Z_n = \quad^\circ$	<i>Z</i> ₁ has the same sign as <i>B</i> . <i>Z</i> ₂ is minus if $F > 90^\circ$. If <i>F</i> is negative, $Z_2 = 180^\circ - Z_2$. Ignore the sign of <i>Z</i> . N <i>Lat</i> : If $LHA > 180^\circ$, $Z_n = Z$, or if $LHA < 180^\circ$, $Z_n = 360^\circ - Z$, S <i>Lat</i> : If $LHA > 180^\circ$, $Z_n = 180^\circ - Z$, or if $LHA < 180^\circ$, $Z_n = 180^\circ + Z$.

POLAR PHENOMENA

EXPLANATION

1. *Introduction.* The graphs on pages 322-325 give data concerning the rising and setting of the Sun and Moon and the duration of civil twilight for high latitudes. Graphs are given instead of tables for high latitudes because they give a clearer picture of the phenomena and of the attainable accuracy in any given case. In the regions of the graph that are difficult to read accurately, the phenomenon itself is generally uncertain.

2. *Semiduration of sunlight.* The graphs for the semiduration of sunlight (page 322) give for latitudes north of $N 65^\circ$ the number of hours from sunrise to meridian passage or from meridian passage to sunset. There is continuous daylight in an area marked "Sun above horizon", and no direct sunlight in an area marked "Sun below horizon". The figures near the top indicate, for several convenient dates, the local mean times of meridian passage; with the aid of the intermediate dots the LMT on any given day may be obtained to the nearest minute. The LMT of sunrise may be found by subtracting the semiduration from the time of meridian passage, and the time of sunset by adding. The equation of time is given by subtracting the time of meridian passage from noon.

Examples. (a) Estimate the time of sunrise and sunset on 2023 March 10 at latitude $N 77^\circ$. The semiduration of sunlight (page 322) is about $5^h 00^m$. The time of meridian passage is $12^h 10^m$, and hence the LMT of sunrise is $07^h 10^m$, and of sunset $17^h 10^m$. (b) Estimate the dates, for the first half of 2023, when the Sun is continuously below and above the horizon at latitude $N 80^\circ$. The semiduration of sunlight graph (page 322) indicates the Sun is continuously below the horizon until about February 21, and is continuously above the horizon after April 14.

3. *Duration of civil twilight.* The graphs for the duration of twilight (page 322) give the interval from the beginning of morning civil twilight (Sun 6° below the horizon) to the time of sunrise or from the time of sunset to the end of evening civil twilight. In a region marked "No twilight or sunlight", the Sun is continuously below the horizon by more than 6° . In a region marked "Continuous twilight or sunlight", the Sun never goes lower than 6° below the horizon.

Adjacent to a region marked "No twilight or sunlight" is a region in which the Sun is continuously below the horizon, but so near to the horizon during a portion of the day that there is twilight. This area is the shaded region. The value given by the graph in this shaded region is the interval from the beginning of morning twilight to meridian passage of the Sun, or from meridian passage to the end of evening twilight, the total duration of twilight being twice the value given by the graph. The border between this shaded region and the remainder of the graph indicates that the Sun only just rises at meridian passage at the date and latitude shown. The remainder of the graph gives the total duration of civil twilight.

Examples. (a) Estimate the time of the beginning of morning civil twilight at latitude $N 77^\circ$ on 2023 March 10. The duration of twilight (page 322) is about $1^h 38^m$. Applying this to the time of sunrise, $07^h 10^m$, found in the preceding example, the beginning of morning civil twilight is $05^h 40^m$ LMT. (b) Estimate, for the first half of 2023, the limiting dates of civil twilight and sunlight at latitude $N 80^\circ$. The graphs (page 322) indicate there is no sunlight or twilight till about February 6, there is twilight but no sunlight from February 6 until February 21, sunlight and twilight till April 1, continuous twilight or sunlight till April 14, and then continuous sunlight. (c) Estimate the time of the beginning and end of civil twilight on 2023 February 14 at latitude $N 80^\circ$. The graph (page 322) indicates there is no direct sunlight at this date and latitude, but three hours of twilight before and after meridian passage occurring at $12^h 14^m$. Thus civil twilight begins at about $09^h 14^m$ and ends at about $15^h 14^m$ LMT.

4. *Semiduration of moonlight* The graphs, for each month, for the semiduration of moonlight give for the Moon the same data as the graphs for the semiduration of sunlight give for the Sun. The scale near the top gives the LMT of meridian passage. In addition, the phase symbols are placed on the graphs to show the day on which each phase occurs. Since the times of meridian passage and the semiduration change more rapidly from day to day for the Moon than for the Sun, special care will be required in reading the graphs accurately.

For most purposes, in these high latitudes, a rough idea of the time of moonrise or moonset is all that is required, and this may be obtained by a glance at the graph.

Example. Estimate the moon phase and the time of moonrise and moonset on 2023 January 15 at latitude N 73°. The phase is found from pages 323-325 to be near last quarter, and the Moon crosses the meridian at 06^h LMT. The semiduration of moonlight taken for the time of meridian passage is 4 hours, giving moonrise at 02^h LMT on January 15 and moonset at 10^h on January 15.

If greater accuracy is required, it is necessary to read the graph for the UT of each phenomenon at the desired meridian. The dates indicated on the graph are for 00^h UT, and intermediate values of the UT may be located by estimation.

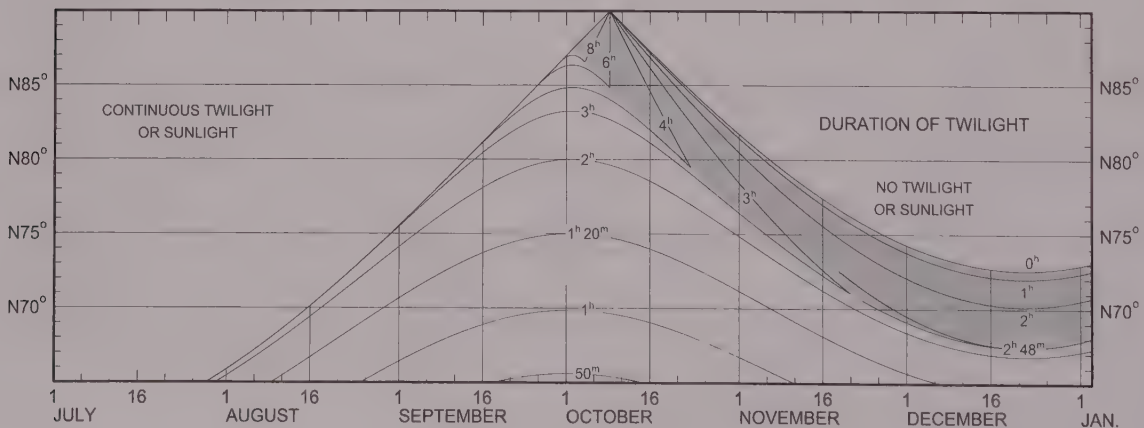
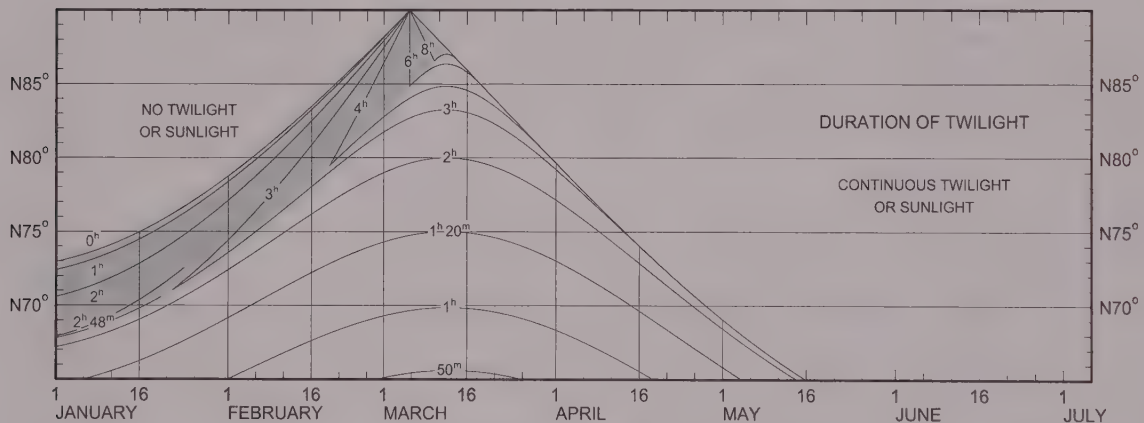
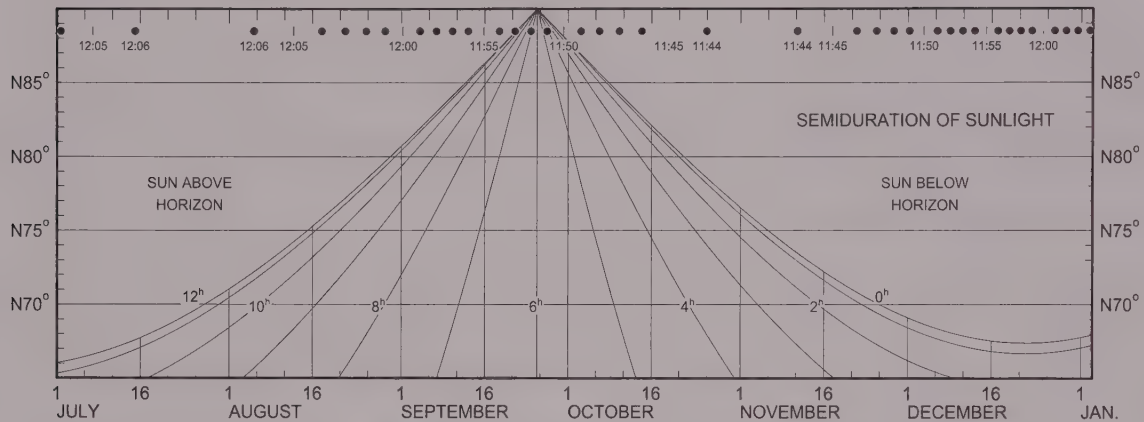
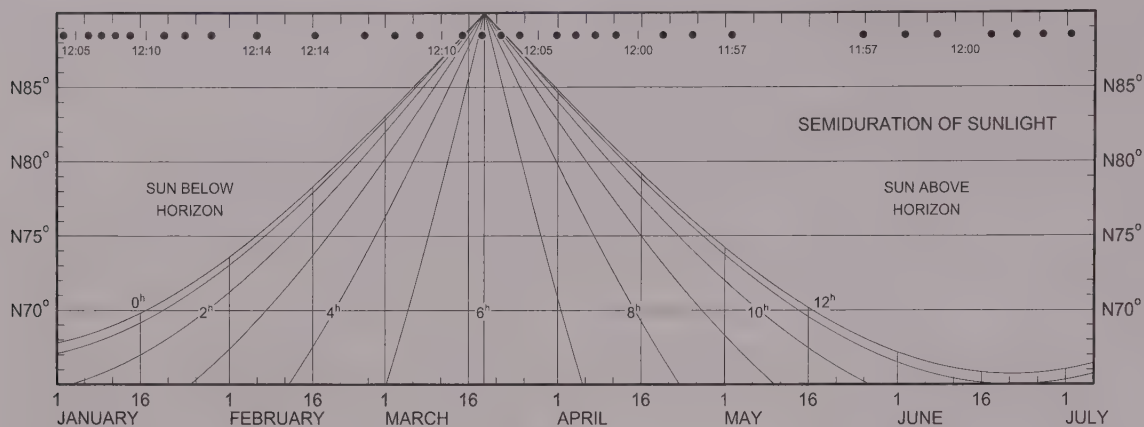
Example. Required to improve the results obtained in the preceding example, assuming the observer to be in longitude W 90° (6^h) west.

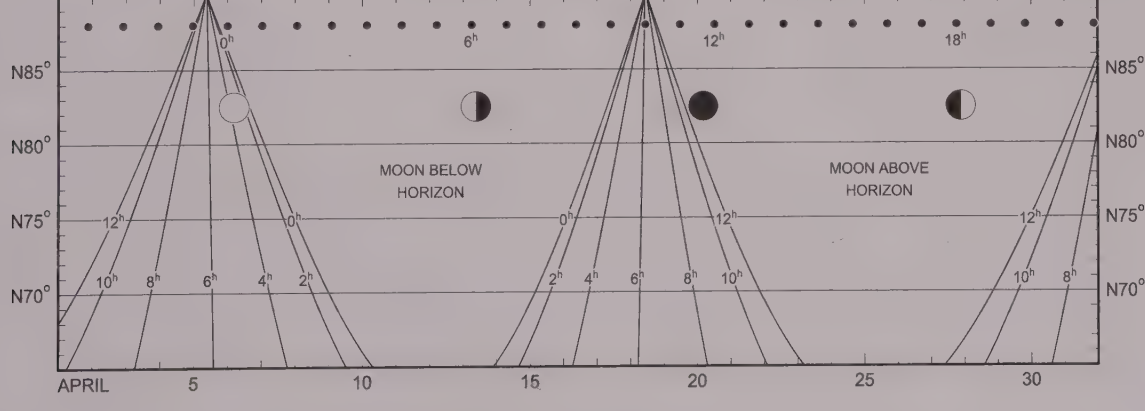
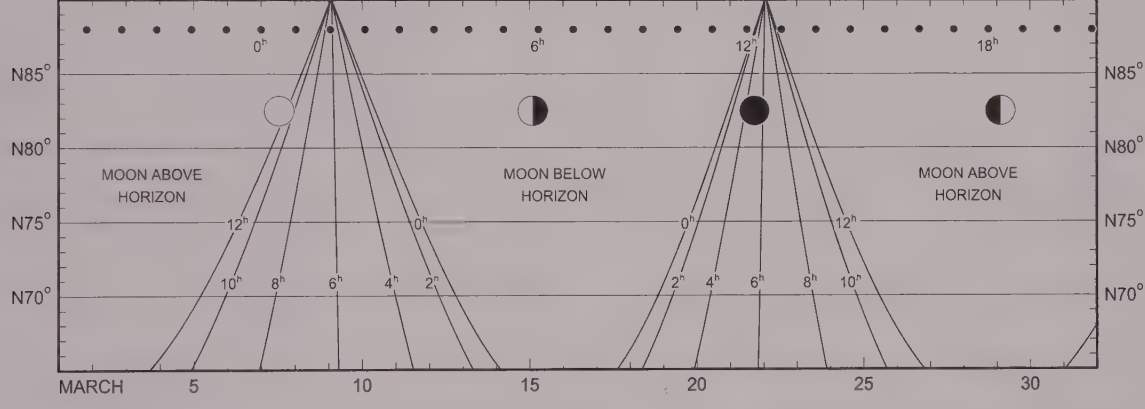
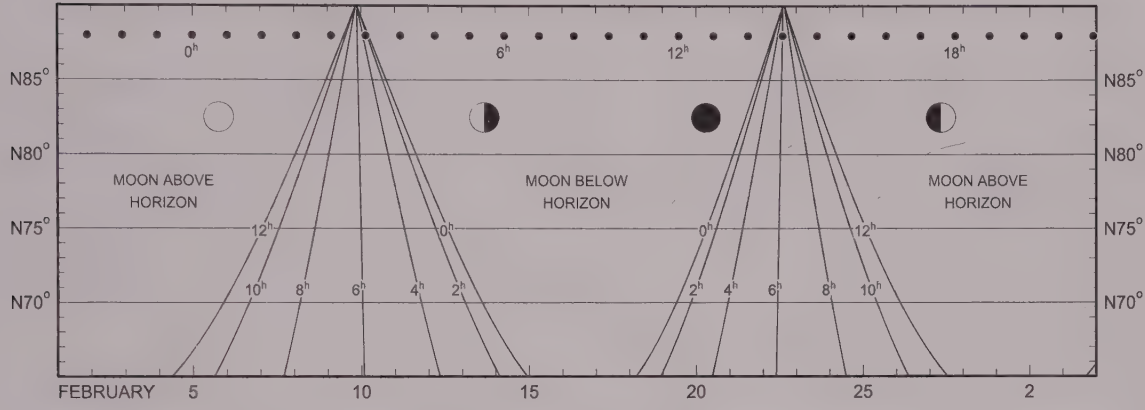
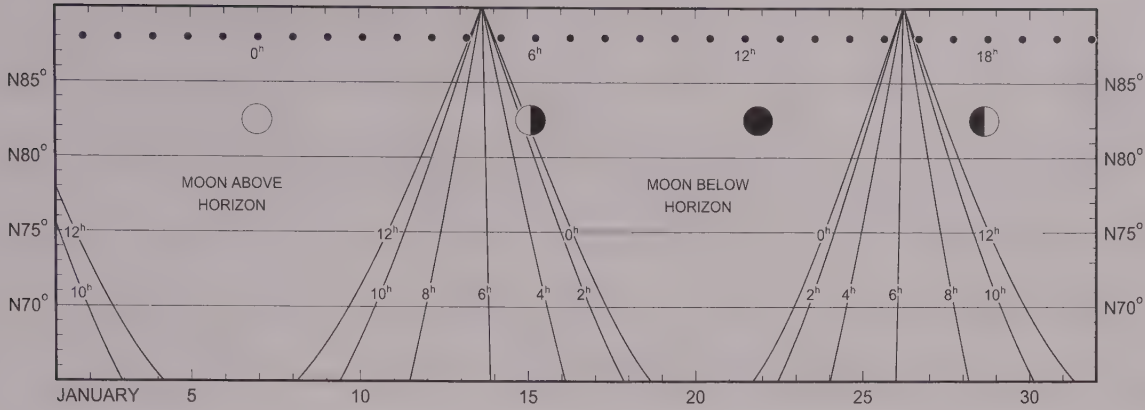
The values found previously were:

			d	h			d	h
Time of meridian passage	2023	Jan.	15	06	LMT	=	Jan.	15 12 UT
Semiduration of moonlight				4				
Time of moonrise		Jan.	15	02	LMT	=	Jan.	15 08 UT
Time of moonset		Jan.	15	10	LMT	=	Jan.	15 16 UT

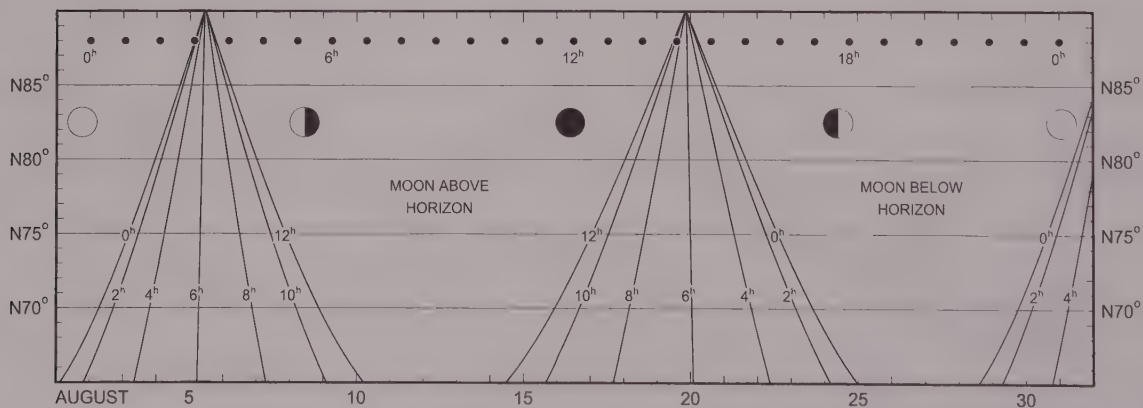
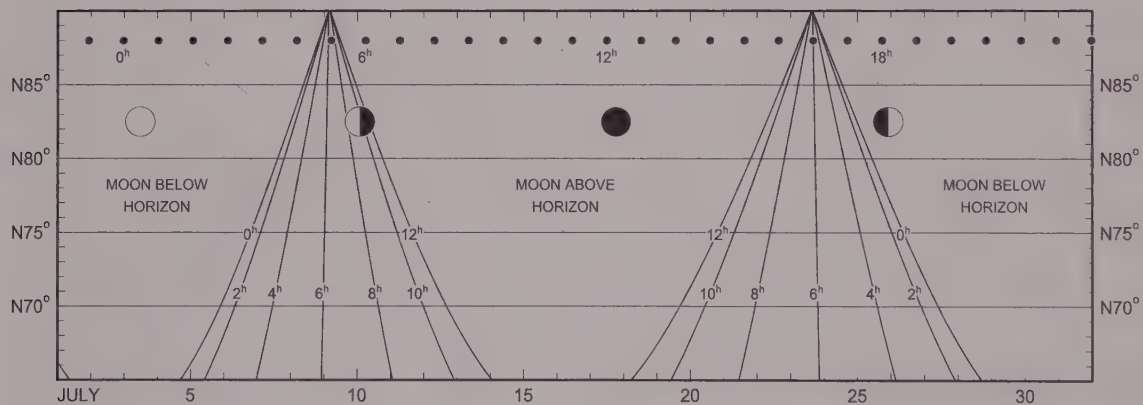
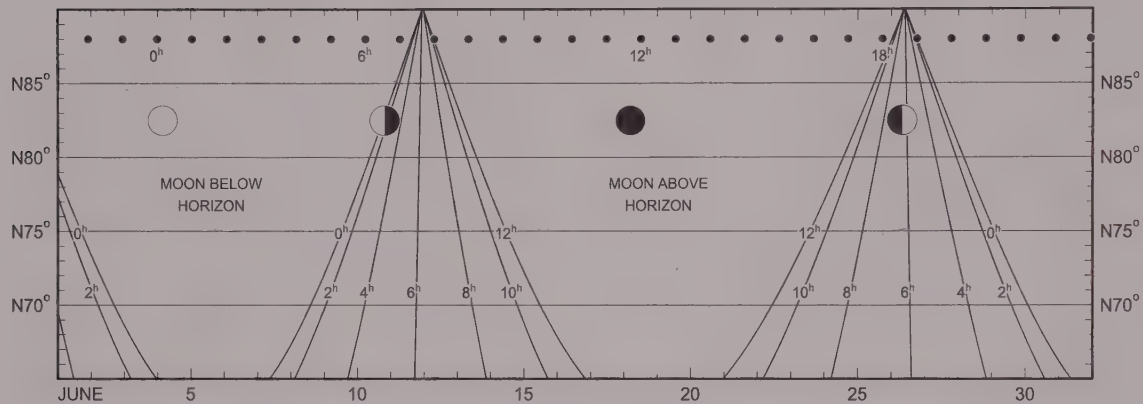
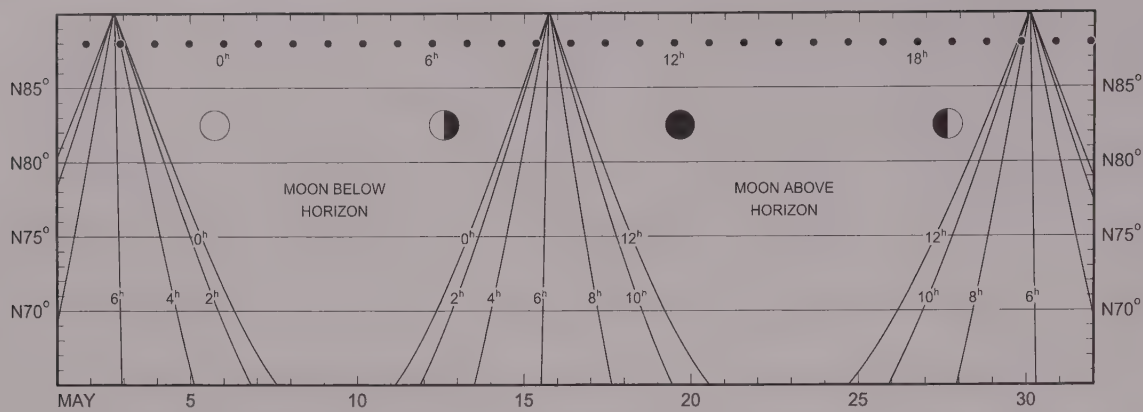
Returning to the graphs (pages 323-325) with these three values of the UT, the following results are obtained:

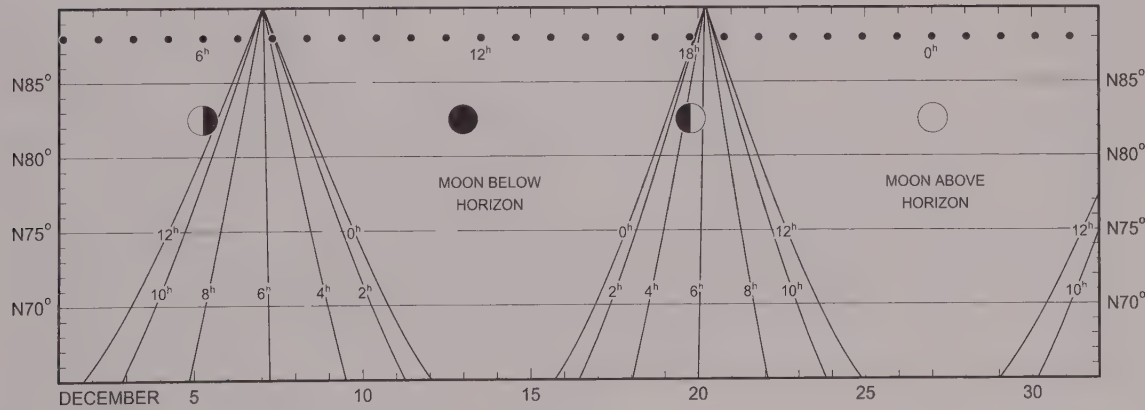
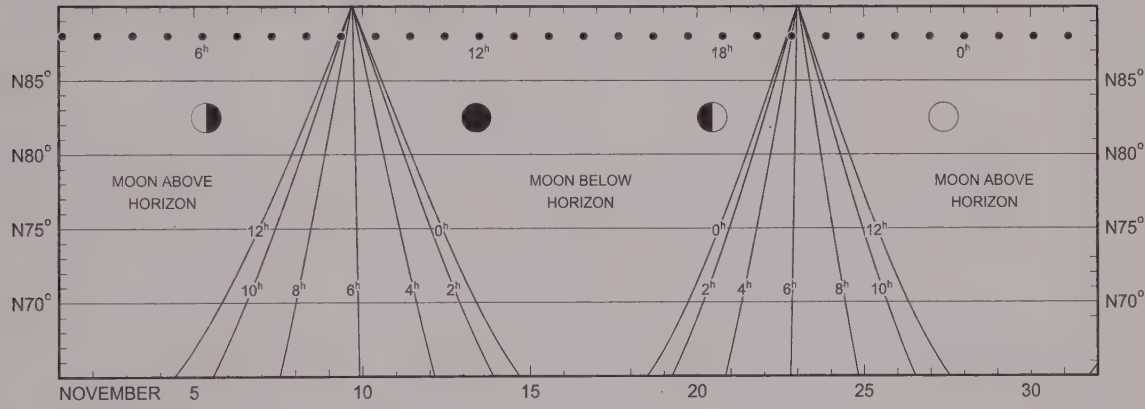
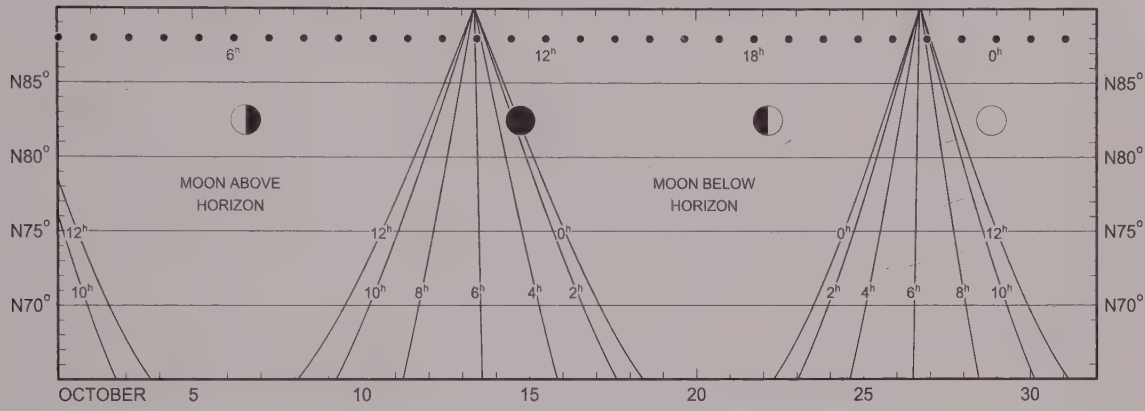
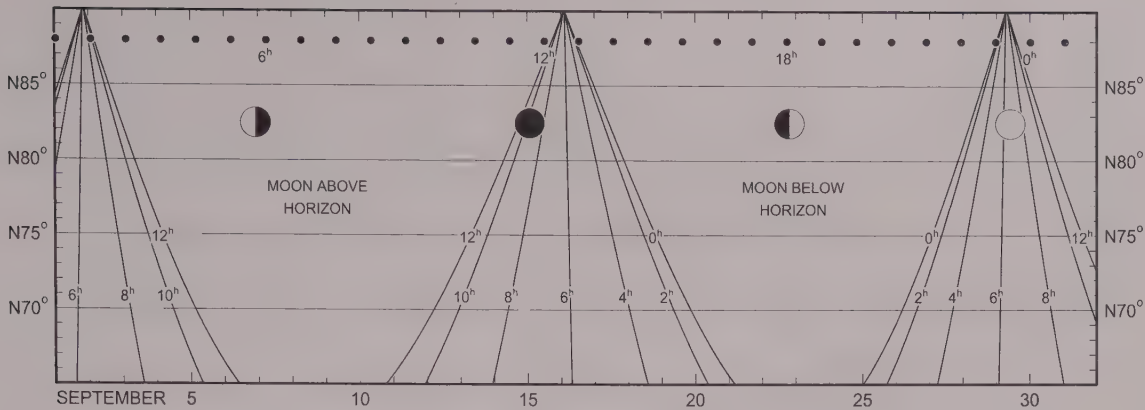
			d	h	m		d	h	m
Time of meridian passage	2023	Jan.	15	06	10	LMT	=	Jan.	15 12 10 UT
Semiduration for moonrise				03	50				
Time of moonrise		Jan.	15	02	20	LMT	=	Jan.	15 08 20 UT
Semiduration for moonset				03	20				
Time of moonset		Jan.	15	09	30	LMT	=	Jan.	15 15 30 UT





SEMIDURATION OF MOONLIGHT





NOTES

CONVERSION OF ARC TO TIME

0°-59°			60°-119°			120°-179°			180°-239°			240°-299°			300°-359°				0'00	0'25	0'50	0'75				
°	h	m	°	h	m	°	h	m	°	h	m	°	h	m	°	h	m	/	m	s	m	s	m	s	m	s
0	0	00	60	4	00	120	8	00	180	12	00	240	16	00	300	20	00	0	0	00	0	01	0	02	0	03
1	0	04	61	4	04	121	8	04	181	12	04	241	16	04	301	20	04	1	0	04	0	05	0	06	0	07
2	0	08	62	4	08	122	8	08	182	12	08	242	16	08	302	20	08	2	0	08	0	09	0	10	0	11
3	0	12	63	4	12	123	8	12	183	12	12	243	16	12	303	20	12	3	0	12	0	13	0	14	0	15
4	0	16	64	4	16	124	8	16	184	12	16	244	16	16	304	20	16	4	0	16	0	17	0	18	0	19
5	0	20	65	4	20	125	8	20	185	12	20	245	16	20	305	20	20	5	0	20	0	21	0	22	0	23
6	0	24	66	4	24	126	8	24	186	12	24	246	16	24	306	20	24	6	0	24	0	25	0	26	0	27
7	0	28	67	4	28	127	8	28	187	12	28	247	16	28	307	20	28	7	0	28	0	29	0	30	0	31
8	0	32	68	4	32	128	8	32	188	12	32	248	16	32	308	20	32	8	0	32	0	33	0	34	0	35
9	0	36	69	4	36	129	8	36	189	12	36	249	16	36	309	20	36	9	0	36	0	37	0	38	0	39
10	0	40	70	4	40	130	8	40	190	12	40	250	16	40	310	20	40	10	0	40	0	41	0	42	0	43
11	0	44	71	4	44	131	8	44	191	12	44	251	16	44	311	20	44	11	0	44	0	45	0	46	0	47
12	0	48	72	4	48	132	8	48	192	12	48	252	16	48	312	20	48	12	0	48	0	49	0	50	0	51
13	0	52	73	4	52	133	8	52	193	12	52	253	16	52	313	20	52	13	0	52	0	53	0	54	0	55
14	0	56	74	4	56	134	8	56	194	12	56	254	16	56	314	20	56	14	0	56	0	57	0	58	0	59
15	1	00	75	5	00	135	9	00	195	13	00	255	17	00	315	21	00	15	1	00	1	01	1	02	1	03
16	1	04	76	5	04	136	9	04	196	13	04	256	17	04	316	21	04	16	1	04	1	05	1	06	1	07
17	1	08	77	5	08	137	9	08	197	13	08	257	17	08	317	21	08	17	1	08	1	09	1	10	1	11
18	1	12	78	5	12	138	9	12	198	13	12	258	17	12	318	21	12	18	1	12	1	13	1	14	1	15
19	1	16	79	5	16	139	9	16	199	13	16	259	17	16	319	21	16	19	1	16	1	17	1	18	1	19
20	1	20	80	5	20	140	9	20	200	13	20	260	17	20	320	21	20	20	1	20	1	21	1	22	1	23
21	1	24	81	5	24	141	9	24	201	13	24	261	17	24	321	21	24	21	1	24	1	25	1	26	1	27
22	1	28	82	5	28	142	9	28	202	13	28	262	17	28	322	21	28	22	1	28	1	29	1	30	1	31
23	1	32	83	5	32	143	9	32	203	13	32	263	17	32	323	21	32	23	1	32	1	33	1	34	1	35
24	1	36	84	5	36	144	9	36	204	13	36	264	17	36	324	21	36	24	1	36	1	37	1	38	1	39
25	1	40	85	5	40	145	9	40	205	13	40	265	17	40	325	21	40	25	1	40	1	41	1	42	1	43
26	1	44	86	5	44	146	9	44	206	13	44	266	17	44	326	21	44	26	1	44	1	45	1	46	1	47
27	1	48	87	5	48	147	9	48	207	13	48	267	17	48	327	21	48	27	1	48	1	49	1	50	1	51
28	1	52	88	5	52	148	9	52	208	13	52	268	17	52	328	21	52	28	1	52	1	53	1	54	1	55
29	1	56	89	5	56	149	9	56	209	13	56	269	17	56	329	21	56	29	1	56	1	57	1	58	1	59
30	2	00	90	6	00	150	10	00	210	14	00	270	18	00	330	22	00	30	2	00	2	01	2	02	2	03
31	2	04	91	6	04	151	10	04	211	14	04	271	18	04	331	22	04	31	2	04	2	05	2	06	2	07
32	2	08	92	6	08	152	10	08	212	14	08	272	18	08	332	22	08	32	2	08	2	09	2	10	2	11
33	2	12	93	6	12	153	10	12	213	14	12	273	18	12	333	22	12	33	2	12	2	13	2	14	2	15
34	2	16	94	6	16	154	10	16	214	14	16	274	18	16	334	22	16	34	2	16	2	17	2	18	2	19
35	2	20	95	6	20	155	10	20	215	14	20	275	18	20	335	22	20	35	2	20	2	21	2	22	2	23
36	2	24	96	6	24	156	10	24	216	14	24	276	18	24	336	22	24	36	2	24	2	25	2	26	2	27
37	2	28	97	6	28	157	10	28	217	14	28	277	18	28	337	22	28	37	2	28	2	29	2	30	2	31
38	2	32	98	6	32	158	10	32	218	14	32	278	18	32	338	22	32	38	2	32	2	33	2	34	2	35
39	2	36	99	6	36	159	10	36	219	14	36	279	18	36	339	22	36	39	2	36	2	37	2	38	2	39
40	2	40	100	6	40	160	10	40	220	14	40	280	18	40	340	22	40	40	2	40	2	41	2	42	2	43
41	2	44	101	6	44	161	10	44	221	14	44	281	18	44	341	22	44	41	2	44	2	45	2	46	2	47
42	2	48	102	6	48	162	10	48	222	14	48	282	18	48	342	22	48	42	2	48	2	49	2	50	2	51
43	2	52	103	6	52	163	10	52	223	14	52	283	18	52	343	22	52	43	2	52	2	53	2	54	2	55
44	2	56	104	6	56	164	10	56	224	14	56	284	18	56	344	22	56	44	2	56	2	57	2	58	2	59
45	3	00	105	7	00	165	11	00	225	15	00	285	19	00	345	23	00	45	3	00	3	01	3	02	3	03
46	3	04	106	7	04	166	11	04	226	15	04	286	19	04	346	23	04	46	3	04	3	05	3	06	3	07
47	3	08	107	7	08	167	11	08	227	15	08	287	19	08	347	23	08	47	3	08	3	09	3	10	3	11
48	3	12	108	7	12	168	11	12	228	15	12	288	19	12	348	23	12	48	3	12	3	13	3	14	3	15
49	3	16	109	7	16	169	11	16	229	15	16	289	19	16	349	23	16	49	3	16	3	17	3	18	3	19
50	3	20	110	7	20	170	11	20	230	15	20	290	19	20	350	23	20	50	3	20	3	21	3	22	3	23
51	3	24	111	7	24	171	11	24	231	15	24	291	19	24	351	23	24	51	3	24	3	25	3	26	3	27
52	3	28	112	7	28	172	11	28	232	15	28	292	19	28	352	23	28	52	3	28	3	29	3	30	3	31
53	3	32	113	7	32	173	11	32	233	15	32	293	19	32	353	23	32	53	3	32	3	33	3	34	3	35
54	3	36	114	7	36	174	11	36	234	15	36	294	19	36	354	23	36	54	3	36	3	37	3	38	3	39
55	3	40	115	7	40	175																				

The above table is for converting expressions in arc to their equivalent in time; its main use in this Almanac is for the conversion of longitude for application to LMT (*added if west, subtracted if east*) to give UT or vice versa, particularly in the case of sunrise, sunset, etc.

0^m

INCREMENTS AND CORRECTIONS

1^m

^m 0	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	^m 1	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /
00	0 00:0	0 00:0	0 00:0	0:0 0:0	6:0 0:1	12:0 0:1	00	0 15:0	0 15:0	0 14:3	0:0 0:0	6:0 0:2	12:0 0:3
01	0 00:3	0 00:3	0 00:2	0:1 0:0	6:1 0:1	12:1 0:1	01	0 15:3	0 15:3	0 14:6	0:1 0:0	6:1 0:2	12:1 0:3
02	0 00:5	0 00:5	0 00:5	0:2 0:0	6:2 0:1	12:2 0:1	02	0 15:5	0 15:5	0 14:8	0:2 0:0	6:2 0:2	12:2 0:3
03	0 00:8	0 00:8	0 00:7	0:3 0:0	6:3 0:1	12:3 0:1	03	0 15:8	0 15:8	0 15:0	0:3 0:0	6:3 0:2	12:3 0:3
04	0 01:0	0 01:0	0 01:0	0:4 0:0	6:4 0:1	12:4 0:1	04	0 16:0	0 16:0	0 15:3	0:4 0:0	6:4 0:2	12:4 0:3
05	0 01:3	0 01:3	0 01:2	0:5 0:0	6:5 0:1	12:5 0:1	05	0 16:3	0 16:3	0 15:5	0:5 0:0	6:5 0:2	12:5 0:3
06	0 01:5	0 01:5	0 01:4	0:6 0:0	6:6 0:1	12:6 0:1	06	0 16:5	0 16:5	0 15:7	0:6 0:0	6:6 0:2	12:6 0:3
07	0 01:8	0 01:8	0 01:7	0:7 0:0	6:7 0:1	12:7 0:1	07	0 16:8	0 16:8	0 16:0	0:7 0:0	6:7 0:2	12:7 0:3
08	0 02:0	0 02:0	0 01:9	0:8 0:0	6:8 0:1	12:8 0:1	08	0 17:0	0 17:0	0 16:2	0:8 0:0	6:8 0:2	12:8 0:3
09	0 02:3	0 02:3	0 02:1	0:9 0:0	6:9 0:1	12:9 0:1	09	0 17:3	0 17:3	0 16:5	0:9 0:0	6:9 0:2	12:9 0:3
10	0 02:5	0 02:5	0 02:4	1:0 0:0	7:0 0:1	13:0 0:1	10	0 17:5	0 17:5	0 16:7	1:0 0:0	7:0 0:2	13:0 0:3
11	0 02:8	0 02:8	0 02:6	1:1 0:0	7:1 0:1	13:1 0:1	11	0 17:8	0 17:8	0 16:9	1:1 0:0	7:1 0:2	13:1 0:3
12	0 03:0	0 03:0	0 02:9	1:2 0:0	7:2 0:1	13:2 0:1	12	0 18:0	0 18:0	0 17:2	1:2 0:0	7:2 0:2	13:2 0:3
13	0 03:3	0 03:3	0 03:1	1:3 0:0	7:3 0:1	13:3 0:1	13	0 18:3	0 18:3	0 17:4	1:3 0:0	7:3 0:2	13:3 0:3
14	0 03:5	0 03:5	0 03:3	1:4 0:0	7:4 0:1	13:4 0:1	14	0 18:5	0 18:6	0 17:7	1:4 0:0	7:4 0:2	13:4 0:3
15	0 03:8	0 03:8	0 03:6	1:5 0:0	7:5 0:1	13:5 0:1	15	0 18:8	0 18:8	0 17:9	1:5 0:0	7:5 0:2	13:5 0:3
16	0 04:0	0 04:0	0 03:8	1:6 0:0	7:6 0:1	13:6 0:1	16	0 19:0	0 19:1	0 18:1	1:6 0:0	7:6 0:2	13:6 0:3
17	0 04:3	0 04:3	0 04:1	1:7 0:0	7:7 0:1	13:7 0:1	17	0 19:3	0 19:3	0 18:4	1:7 0:0	7:7 0:2	13:7 0:3
18	0 04:5	0 04:5	0 04:3	1:8 0:0	7:8 0:1	13:8 0:1	18	0 19:5	0 19:6	0 18:6	1:8 0:0	7:8 0:2	13:8 0:3
19	0 04:8	0 04:8	0 04:5	1:9 0:0	7:9 0:1	13:9 0:1	19	0 19:8	0 19:8	0 18:9	1:9 0:0	7:9 0:2	13:9 0:3
20	0 05:0	0 05:0	0 04:8	2:0 0:0	8:0 0:1	14:0 0:1	20	0 20:0	0 20:1	0 19:1	2:0 0:1	8:0 0:2	14:0 0:4
21	0 05:3	0 05:3	0 05:0	2:1 0:0	8:1 0:1	14:1 0:1	21	0 20:3	0 20:3	0 19:3	2:1 0:1	8:1 0:2	14:1 0:4
22	0 05:5	0 05:5	0 05:2	2:2 0:0	8:2 0:1	14:2 0:1	22	0 20:5	0 20:6	0 19:6	2:2 0:1	8:2 0:2	14:2 0:4
23	0 05:8	0 05:8	0 05:5	2:3 0:0	8:3 0:1	14:3 0:1	23	0 20:8	0 20:8	0 19:8	2:3 0:1	8:3 0:2	14:3 0:4
24	0 06:0	0 06:0	0 05:7	2:4 0:0	8:4 0:1	14:4 0:1	24	0 21:0	0 21:1	0 20:0	2:4 0:1	8:4 0:2	14:4 0:4
25	0 06:3	0 06:3	0 06:0	2:5 0:0	8:5 0:1	14:5 0:1	25	0 21:3	0 21:3	0 20:3	2:5 0:1	8:5 0:2	14:5 0:4
26	0 06:5	0 06:5	0 06:2	2:6 0:0	8:6 0:1	14:6 0:1	26	0 21:5	0 21:6	0 20:5	2:6 0:1	8:6 0:2	14:6 0:4
27	0 06:8	0 06:8	0 06:4	2:7 0:0	8:7 0:1	14:7 0:1	27	0 21:8	0 21:8	0 20:8	2:7 0:1	8:7 0:2	14:7 0:4
28	0 07:0	0 07:0	0 06:7	2:8 0:0	8:8 0:1	14:8 0:1	28	0 22:0	0 22:1	0 21:0	2:8 0:1	8:8 0:2	14:8 0:4
29	0 07:3	0 07:3	0 06:9	2:9 0:0	8:9 0:1	14:9 0:1	29	0 22:3	0 22:3	0 21:2	2:9 0:1	8:9 0:2	14:9 0:4
30	0 07:5	0 07:5	0 07:2	3:0 0:0	9:0 0:1	15:0 0:1	30	0 22:5	0 22:6	0 21:5	3:0 0:1	9:0 0:2	15:0 0:4
31	0 07:8	0 07:8	0 07:4	3:1 0:0	9:1 0:1	15:1 0:1	31	0 22:8	0 22:8	0 21:7	3:1 0:1	9:1 0:2	15:1 0:4
32	0 08:0	0 08:0	0 07:6	3:2 0:0	9:2 0:1	15:2 0:1	32	0 23:0	0 23:1	0 22:0	3:2 0:1	9:2 0:2	15:2 0:4
33	0 08:3	0 08:3	0 07:9	3:3 0:0	9:3 0:1	15:3 0:1	33	0 23:3	0 23:3	0 22:2	3:3 0:1	9:3 0:2	15:3 0:4
34	0 08:5	0 08:5	0 08:1	3:4 0:0	9:4 0:1	15:4 0:1	34	0 23:5	0 23:6	0 22:4	3:4 0:1	9:4 0:2	15:4 0:4
35	0 08:8	0 08:8	0 08:4	3:5 0:0	9:5 0:1	15:5 0:1	35	0 23:8	0 23:8	0 22:7	3:5 0:1	9:5 0:2	15:5 0:4
36	0 09:0	0 09:0	0 08:6	3:6 0:0	9:6 0:1	15:6 0:1	36	0 24:0	0 24:1	0 22:9	3:6 0:1	9:6 0:2	15:6 0:4
37	0 09:3	0 09:3	0 08:8	3:7 0:0	9:7 0:1	15:7 0:1	37	0 24:3	0 24:3	0 23:1	3:7 0:1	9:7 0:2	15:7 0:4
38	0 09:5	0 09:5	0 09:1	3:8 0:0	9:8 0:1	15:8 0:1	38	0 24:5	0 24:6	0 23:4	3:8 0:1	9:8 0:2	15:8 0:4
39	0 09:8	0 09:8	0 09:3	3:9 0:0	9:9 0:1	15:9 0:1	39	0 24:8	0 24:8	0 23:6	3:9 0:1	9:9 0:2	15:9 0:4
40	0 10:0	0 10:0	0 09:5	4:0 0:0	10:0 0:1	16:0 0:1	40	0 25:0	0 25:1	0 23:9	4:0 0:1	10:0 0:3	16:0 0:4
41	0 10:3	0 10:3	0 09:8	4:1 0:0	10:1 0:1	16:1 0:1	41	0 25:3	0 25:3	0 24:1	4:1 0:1	10:1 0:3	16:1 0:4
42	0 10:5	0 10:5	0 10:0	4:2 0:0	10:2 0:1	16:2 0:1	42	0 25:5	0 25:6	0 24:3	4:2 0:1	10:2 0:3	16:2 0:4
43	0 10:8	0 10:8	0 10:3	4:3 0:0	10:3 0:1	16:3 0:1	43	0 25:8	0 25:8	0 24:6	4:3 0:1	10:3 0:3	16:3 0:4
44	0 11:0	0 11:0	0 10:5	4:4 0:0	10:4 0:1	16:4 0:1	44	0 26:0	0 26:1	0 24:8	4:4 0:1	10:4 0:3	16:4 0:4
45	0 11:3	0 11:3	0 10:7	4:5 0:0	10:5 0:1	16:5 0:1	45	0 26:3	0 26:3	0 25:1	4:5 0:1	10:5 0:3	16:5 0:4
46	0 11:5	0 11:5	0 11:0	4:6 0:0	10:6 0:1	16:6 0:1	46	0 26:5	0 26:6	0 25:3	4:6 0:1	10:6 0:3	16:6 0:4
47	0 11:8	0 11:8	0 11:2	4:7 0:0	10:7 0:1	16:7 0:1	47	0 26:8	0 26:8	0 25:5	4:7 0:1	10:7 0:3	16:7 0:4
48	0 12:0	0 12:0	0 11:5	4:8 0:0	10:8 0:1	16:8 0:1	48	0 27:0	0 27:1	0 25:8	4:8 0:1	10:8 0:3	16:8 0:4
49	0 12:3	0 12:3	0 11:7	4:9 0:0	10:9 0:1	16:9 0:1	49	0 27:3	0 27:3	0 26:0	4:9 0:1	10:9 0:3	16:9 0:4
50	0 12:5	0 12:5	0 11:9	5:0 0:0	11:0 0:1	17:0 0:1	50	0 27:5	0 27:6	0 26:2	5:0 0:1	11:0 0:3	17:0 0:4
51	0 12:8	0 12:8	0 12:2	5:1 0:0	11:1 0:1	17:1 0:1	51	0 27:8	0 27:8	0 26:5	5:1 0:1	11:1 0:3	17:1 0:4
52	0 13:0	0 13:0	0 12:4	5:2 0:0	11:2 0:1	17:2 0:1	52	0 28:0	0 28:1	0 26:7	5:2 0:1	11:2 0:3	17:2 0:4
53	0 13:3	0 13:3	0 12:6	5:3 0:0	11:3 0:1	17:3 0:1	53	0 28:3	0 28:3	0 27:0	5:3 0:1	11:3 0:3	17:3 0:4
54	0 13:5	0 13:5	0 12:9	5:4 0:0	11:4 0:1	17:4 0:1	54	0 28:5	0 28:6	0 27:2	5:4 0:1	11:4 0:3	17:4 0:4
55	0 13:8	0 13:8	0 13:1	5:5 0:0	11:5 0:1	17:5 0:1	55	0 28:8	0 28:8	0 27:4	5:5 0:1	11:5 0:3	17:5 0:4
56	0 14:0	0 14:0	0 13:4	5:6 0:0	11:6 0:1	17:6 0:1	56	0 29:0	0 29:1	0 27:7	5:6 0:1	11:6 0:3	17:6 0:4
57	0 14:3	0 14:3	0 13:6	5:7 0:0	11:7 0:1	17:7 0:1	57	0 29:3	0 29:3	0 27:9	5:7 0:1	11:7 0:3	17:7 0:4
58	0 14:5	0 14:5	0 13:8	5:8 0:0	11:8 0:1	17:8 0:1	58	0 29:5	0 29:6	0 28:2	5:8 0:1	11:8 0:3	17:8 0:4
59	0 14:8	0 14:8	0 14:1	5:9 0:0	11:9 0:1	17:9 0:1	59	0 29:8	0 29:8	0 28:4	5:9 0:1	11:9 0:3	17:9 0:4
60	0 15:0	0 15:0	0 14:3	6:0 0:1	12:0 0:1	18:0 0:2	60	0 30:0	0 30:1	0 28:6	6:0 0:2	12:0 0:3	18:0 0:5

^m 2	SUN PLANETS	ARIES	MOON	^h or d	Corr ⁿ	^h or d	Corr ⁿ	^h or d	Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	/ /	/ /	/ /
00	0 30.0	0 30.1	0 28.6	0.0	0.0	6.0	0.3	12.0	0.5
01	0 30.3	0 30.3	0 28.9	0.1	0.0	6.1	0.3	12.1	0.5
02	0 30.5	0 30.6	0 29.1	0.2	0.0	6.2	0.3	12.2	0.5
03	0 30.8	0 30.8	0 29.3	0.3	0.0	6.3	0.3	12.3	0.5
04	0 31.0	0 31.1	0 29.6	0.4	0.0	6.4	0.3	12.4	0.5
05	0 31.3	0 31.3	0 29.8	0.5	0.0	6.5	0.3	12.5	0.5
06	0 31.5	0 31.6	0 30.1	0.6	0.0	6.6	0.3	12.6	0.5
07	0 31.8	0 31.8	0 30.3	0.7	0.0	6.7	0.3	12.7	0.5
08	0 32.0	0 32.1	0 30.5	0.8	0.0	6.8	0.3	12.8	0.5
09	0 32.3	0 32.3	0 30.8	0.9	0.0	6.9	0.3	12.9	0.5
10	0 32.5	0 32.6	0 31.0	1.0	0.0	7.0	0.3	13.0	0.5
11	0 32.8	0 32.8	0 31.3	1.1	0.0	7.1	0.3	13.1	0.5
12	0 33.0	0 33.1	0 31.5	1.2	0.1	7.2	0.3	13.2	0.6
13	0 33.3	0 33.3	0 31.7	1.3	0.1	7.3	0.3	13.3	0.6
14	0 33.5	0 33.6	0 32.0	1.4	0.1	7.4	0.3	13.4	0.6
15	0 33.8	0 33.8	0 32.2	1.5	0.1	7.5	0.3	13.5	0.6
16	0 34.0	0 34.1	0 32.5	1.6	0.1	7.6	0.3	13.6	0.6
17	0 34.3	0 34.3	0 32.7	1.7	0.1	7.7	0.3	13.7	0.6
18	0 34.5	0 34.6	0 32.9	1.8	0.1	7.8	0.3	13.8	0.6
19	0 34.8	0 34.8	0 33.2	1.9	0.1	7.9	0.3	13.9	0.6
20	0 35.0	0 35.1	0 33.4	2.0	0.1	8.0	0.3	14.0	0.6
21	0 35.3	0 35.3	0 33.6	2.1	0.1	8.1	0.3	14.1	0.6
22	0 35.5	0 35.6	0 33.9	2.2	0.1	8.2	0.3	14.2	0.6
23	0 35.8	0 35.8	0 34.1	2.3	0.1	8.3	0.3	14.3	0.6
24	0 36.0	0 36.1	0 34.4	2.4	0.1	8.4	0.4	14.4	0.6
25	0 36.3	0 36.3	0 34.6	2.5	0.1	8.5	0.4	14.5	0.6
26	0 36.5	0 36.6	0 34.8	2.6	0.1	8.6	0.4	14.6	0.6
27	0 36.8	0 36.9	0 35.1	2.7	0.1	8.7	0.4	14.7	0.6
28	0 37.0	0 37.1	0 35.3	2.8	0.1	8.8	0.4	14.8	0.6
29	0 37.3	0 37.4	0 35.6	2.9	0.1	8.9	0.4	14.9	0.6
30	0 37.5	0 37.6	0 35.8	3.0	0.1	9.0	0.4	15.0	0.6
31	0 37.8	0 37.9	0 36.0	3.1	0.1	9.1	0.4	15.1	0.6
32	0 38.0	0 38.1	0 36.3	3.2	0.1	9.2	0.4	15.2	0.6
33	0 38.3	0 38.4	0 36.5	3.3	0.1	9.3	0.4	15.3	0.6
34	0 38.5	0 38.6	0 36.7	3.4	0.1	9.4	0.4	15.4	0.6
35	0 38.8	0 38.9	0 37.0	3.5	0.1	9.5	0.4	15.5	0.6
36	0 39.0	0 39.1	0 37.2	3.6	0.2	9.6	0.4	15.6	0.7
37	0 39.3	0 39.4	0 37.5	3.7	0.2	9.7	0.4	15.7	0.7
38	0 39.5	0 39.6	0 37.7	3.8	0.2	9.8	0.4	15.8	0.7
39	0 39.8	0 39.9	0 37.9	3.9	0.2	9.9	0.4	15.9	0.7
40	0 40.0	0 40.1	0 38.2	4.0	0.2	10.0	0.4	16.0	0.7
41	0 40.3	0 40.4	0 38.4	4.1	0.2	10.1	0.4	16.1	0.7
42	0 40.5	0 40.6	0 38.7	4.2	0.2	10.2	0.4	16.2	0.7
43	0 40.8	0 40.9	0 38.9	4.3	0.2	10.3	0.4	16.3	0.7
44	0 41.0	0 41.1	0 39.1	4.4	0.2	10.4	0.4	16.4	0.7
45	0 41.3	0 41.4	0 39.4	4.5	0.2	10.5	0.4	16.5	0.7
46	0 41.5	0 41.6	0 39.6	4.6	0.2	10.6	0.4	16.6	0.7
47	0 41.8	0 41.9	0 39.8	4.7	0.2	10.7	0.4	16.7	0.7
48	0 42.0	0 42.1	0 40.1	4.8	0.2	10.8	0.5	16.8	0.7
49	0 42.3	0 42.4	0 40.3	4.9	0.2	10.9	0.5	16.9	0.7
50	0 42.5	0 42.6	0 40.6	5.0	0.2	11.0	0.5	17.0	0.7
51	0 42.8	0 42.9	0 40.8	5.1	0.2	11.1	0.5	17.1	0.7
52	0 43.0	0 43.1	0 41.0	5.2	0.2	11.2	0.5	17.2	0.7
53	0 43.3	0 43.4	0 41.3	5.3	0.2	11.3	0.5	17.3	0.7
54	0 43.5	0 43.6	0 41.5	5.4	0.2	11.4	0.5	17.4	0.7
55	0 43.8	0 43.9	0 41.8	5.5	0.2	11.5	0.5	17.5	0.7
56	0 44.0	0 44.1	0 42.0	5.6	0.2	11.6	0.5	17.6	0.7
57	0 44.3	0 44.4	0 42.2	5.7	0.2	11.7	0.5	17.7	0.7
58	0 44.5	0 44.6	0 42.5	5.8	0.2	11.8	0.5	17.8	0.7
59	0 44.8	0 44.9	0 42.7	5.9	0.2	11.9	0.5	17.9	0.7
60	0 45.0	0 45.1	0 43.0	6.0	0.3	12.0	0.5	18.0	0.8

^m 3	SUN PLANETS	ARIES	MOON	^h or d	Corr ⁿ	^h or d	Corr ⁿ	^h or d	Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	/ /	/ /	/ /
00	0 45.0	0 45.1	0 43.0	0.0	0.0	6.0	0.4	12.0	0.7
01	0 45.3	0 45.4	0 43.2	0.1	0.0	6.1	0.4	12.1	0.7
02	0 45.5	0 45.6	0 43.4	0.2	0.0	6.2	0.4	12.2	0.7
03	0 45.8	0 45.9	0 43.7	0.3	0.0	6.3	0.4	12.3	0.7
04	0 46.0	0 46.1	0 43.9	0.4	0.0	6.4	0.4	12.4	0.7
05	0 46.3	0 46.4	0 44.1	0.5	0.0	6.5	0.4	12.5	0.7
06	0 46.5	0 46.6	0 44.4	0.6	0.0	6.6	0.4	12.6	0.7
07	0 46.8	0 46.9	0 44.6	0.7	0.0	6.7	0.4	12.7	0.7
08	0 47.0	0 47.1	0 44.9	0.8	0.0	6.8	0.4	12.8	0.7
09	0 47.3	0 47.4	0 45.1	0.9	0.1	6.9	0.4	12.9	0.8
10	0 47.5	0 47.6	0 45.3	1.0	0.1	7.0	0.4	13.0	0.8
11	0 47.8	0 47.9	0 45.6	1.1	0.1	7.1	0.4	13.1	0.8
12	0 48.0	0 48.1	0 45.8	1.2	0.1	7.2	0.4	13.2	0.8
13	0 48.3	0 48.4	0 46.1	1.3	0.1	7.3	0.4	13.3	0.8
14	0 48.5	0 48.6	0 46.3	1.4	0.1	7.4	0.4	13.4	0.8
15	0 48.8	0 48.9	0 46.5	1.5	0.1	7.5	0.4	13.5	0.8
16	0 49.0	0 49.1	0 46.8	1.6	0.1	7.6	0.4	13.6	0.8
17	0 49.3	0 49.4	0 47.0	1.7	0.1	7.7	0.4	13.7	0.8
18	0 49.5	0 49.6	0 47.2	1.8	0.1	7.8	0.5	13.8	0.8
19	0 49.8	0 49.9	0 47.5	1.9	0.1	7.9	0.5	13.9	0.8
20	0 50.0	0 50.1	0 47.7	2.0	0.1	8.0	0.5	14.0	0.8
21	0 50.3	0 50.4	0 48.0	2.1	0.1	8.1	0.5	14.1	0.8
22	0 50.5	0 50.6	0 48.2	2.2	0.1	8.2	0.5	14.2	0.8
23	0 50.8	0 50.9	0 48.4	2.3	0.1	8.3	0.5	14.3	0.8
24	0 51.0	0 51.1	0 48.7	2.4	0.1	8.4	0.5	14.4	0.8
25	0 51.3	0 51.4	0 48.9	2.5	0.1	8.5	0.5	14.5	0.8
26	0 51.5	0 51.6	0 49.2	2.6	0.2	8.6	0.5	14.6	0.9
27	0 51.8	0 51.9	0 49.4	2.7	0.2	8.7	0.5	14.7	0.9
28	0 52.0	0 52.1	0 49.6	2.8	0.2	8.8	0.5	14.8	0.9
29	0 52.3	0 52.4	0 49.9	2.9	0.2	8.9	0.5	14.9	0.9
30	0 52.5	0 52.6	0 50.1	3.0	0.2	9.0	0.5	15.0	0.9
31	0 52.8	0 52.9	0 50.3	3.1	0.2	9.1	0.5	15.1	0.9
32	0 53.0	0 53.1	0 50.6	3.2	0.2	9.2	0.5	15.2	0.9
33	0 53.3	0 53.4	0 50.8	3.3	0.2	9.3	0.5	15.3	0.9
34	0 53.5	0 53.6	0 51.1	3.4	0.2	9.4	0.5	15.4	0.9
35	0 53.8	0 53.9	0 51.3	3.5	0.2	9.5	0.6	15.5	0.9
36	0 54.0	0 54.1	0 51.5	3.6	0.2	9.6	0.6	15.6	0.9
37	0 54.3	0 54.4	0 51.8	3.7	0.2	9.7	0.6	15.7	0.9
38	0 54.5	0 54.6	0 52.0	3.8	0.2	9.8	0.6	15.8	0.9
39	0 54.8	0 54.9	0 52.3	3.9	0.2	9.9	0.6	15.9	0.9
40	0 55.0	0 55.2	0 52.5	4.0	0.2	10.0	0.6	16.0	0.9
41	0 55.3	0 55.4	0 52.7	4.1	0.2	10.1	0.6	16.1	0.9
42	0 55.5	0 55.7	0 53.0	4.2	0.2	10.2	0.6	16.2	0.9
43	0 55.8	0 55.9	0 53.2	4.3	0.3	10.3	0.6	16.3	1.0
44	0 56.0	0 56.2	0 53.4	4.4	0.3	10.4	0.6	16.4	1.0
45	0 56.3	0 56.4	0 53.7	4.5	0.3	10.5	0.6	16.5	1.0
46	0 56.5	0 56.7	0 53.9	4.6	0.3	10.6	0.6	16.6	1.0
47	0 56.8	0 56.9	0 54.2	4.7	0.3	10.7	0.6	16.7	1.0
48	0 57.0	0 57.2	0 54.4	4.8	0.3	10.8	0.6	16.8	1.0
49	0 57.3	0 57.4	0 54.6	4.9	0.3	10.9	0.6	16.9	1.0
50	0 57.5	0 57.7	0 54.9	5.0	0.3	11.0	0.6	17.0	1.0
51	0 57.8	0 57.9	0 55.1	5.1	0.3	11.1	0.6	17.1	1.0
52	0 58.0	0 58.2	0 55.4	5.2	0.3	11.2	0.7	17.2	1.0
53	0 58.3	0 58.4	0 55.6	5.3	0.3	11.3	0.7	17.3	1.0
54	0 58.5	0 58.7	0 55.8	5.4	0.3	11.4	0.7	17.4	1.0
55	0 58.8	0 58.9	0 56.1	5.5	0.3	11.5	0.7	17.5	1.0
56	0 59.0	0 59.2	0 56.3	5.6	0.3	11.6	0.7	17.6	1.0
57	0 59.3	0 59.4	0 56.6	5.7	0.3	11.7	0.7	17.7	1.0
58	0 59.5	0 59.7	0 56.8	5.8	0.3	11.8	0.7	17.8	1.0
59	0 59.8	0 59.9	0 57.0	5.9	0.3	11.9	0.7	17.9	1.0
60	1 00.0	1 00.2	0 57.3	6.0	0.4	12.0	0.7	18.0	1.1

^m 4	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	1 00-0	1 00-2	0 57-3	0-0 0-0	6-0 0-5	12-0 0-9
01	1 00-3	1 00-4	0 57-5	0-1 0-0	6-1 0-5	12-1 0-9
02	1 00-5	1 00-7	0 57-7	0-2 0-0	6-2 0-5	12-2 0-9
03	1 00-8	1 00-9	0 58-0	0-3 0-0	6-3 0-5	12-3 0-9
04	1 01-0	1 01-2	0 58-2	0-4 0-0	6-4 0-5	12-4 0-9
05	1 01-3	1 01-4	0 58-5	0-5 0-0	6-5 0-5	12-5 0-9
06	1 01-5	1 01-7	0 58-7	0-6 0-0	6-6 0-5	12-6 0-9
07	1 01-8	1 01-9	0 58-9	0-7 0-1	6-7 0-5	12-7 1-0
08	1 02-0	1 02-2	0 59-2	0-8 0-1	6-8 0-5	12-8 1-0
09	1 02-3	1 02-4	0 59-4	0-9 0-1	6-9 0-5	12-9 1-0
10	1 02-5	1 02-7	0 59-7	1-0 0-1	7-0 0-5	13-0 1-0
11	1 02-8	1 02-9	0 59-9	1-1 0-1	7-1 0-5	13-1 1-0
12	1 03-0	1 03-2	1 00-1	1-2 0-1	7-2 0-5	13-2 1-0
13	1 03-3	1 03-4	1 00-4	1-3 0-1	7-3 0-5	13-3 1-0
14	1 03-5	1 03-7	1 00-6	1-4 0-1	7-4 0-6	13-4 1-0
15	1 03-8	1 03-9	1 00-8	1-5 0-1	7-5 0-6	13-5 1-0
16	1 04-0	1 04-2	1 01-1	1-6 0-1	7-6 0-6	13-6 1-0
17	1 04-3	1 04-4	1 01-3	1-7 0-1	7-7 0-6	13-7 1-0
18	1 04-5	1 04-7	1 01-6	1-8 0-1	7-8 0-6	13-8 1-0
19	1 04-8	1 04-9	1 01-8	1-9 0-1	7-9 0-6	13-9 1-0
20	1 05-0	1 05-2	1 02-0	2-0 0-2	8-0 0-6	14-0 1-1
21	1 05-3	1 05-4	1 02-3	2-1 0-2	8-1 0-6	14-1 1-1
22	1 05-5	1 05-7	1 02-5	2-2 0-2	8-2 0-6	14-2 1-1
23	1 05-8	1 05-9	1 02-8	2-3 0-2	8-3 0-6	14-3 1-1
24	1 06-0	1 06-2	1 03-0	2-4 0-2	8-4 0-6	14-4 1-1
25	1 06-3	1 06-4	1 03-2	2-5 0-2	8-5 0-6	14-5 1-1
26	1 06-5	1 06-7	1 03-5	2-6 0-2	8-6 0-6	14-6 1-1
27	1 06-8	1 06-9	1 03-7	2-7 0-2	8-7 0-7	14-7 1-1
28	1 07-0	1 07-2	1 03-9	2-8 0-2	8-8 0-7	14-8 1-1
29	1 07-3	1 07-4	1 04-2	2-9 0-2	8-9 0-7	14-9 1-1
30	1 07-5	1 07-7	1 04-4	3-0 0-2	9-0 0-7	15-0 1-1
31	1 07-8	1 07-9	1 04-7	3-1 0-2	9-1 0-7	15-1 1-1
32	1 08-0	1 08-2	1 04-9	3-2 0-2	9-2 0-7	15-2 1-1
33	1 08-3	1 08-4	1 05-1	3-3 0-2	9-3 0-7	15-3 1-1
34	1 08-5	1 08-7	1 05-4	3-4 0-3	9-4 0-7	15-4 1-2
35	1 08-8	1 08-9	1 05-6	3-5 0-3	9-5 0-7	15-5 1-2
36	1 09-0	1 09-2	1 05-9	3-6 0-3	9-6 0-7	15-6 1-2
37	1 09-3	1 09-4	1 06-1	3-7 0-3	9-7 0-7	15-7 1-2
38	1 09-5	1 09-7	1 06-3	3-8 0-3	9-8 0-7	15-8 1-2
39	1 09-8	1 09-9	1 06-6	3-9 0-3	9-9 0-7	15-9 1-2
40	1 10-0	1 10-2	1 06-8	4-0 0-3	10-0 0-8	16-0 1-2
41	1 10-3	1 10-4	1 07-0	4-1 0-3	10-1 0-8	16-1 1-2
42	1 10-5	1 10-7	1 07-3	4-2 0-3	10-2 0-8	16-2 1-2
43	1 10-8	1 10-9	1 07-5	4-3 0-3	10-3 0-8	16-3 1-2
44	1 11-0	1 11-2	1 07-8	4-4 0-3	10-4 0-8	16-4 1-2
45	1 11-3	1 11-4	1 08-0	4-5 0-3	10-5 0-8	16-5 1-2
46	1 11-5	1 11-7	1 08-2	4-6 0-3	10-6 0-8	16-6 1-2
47	1 11-8	1 11-9	1 08-5	4-7 0-4	10-7 0-8	16-7 1-3
48	1 12-0	1 12-2	1 08-7	4-8 0-4	10-8 0-8	16-8 1-3
49	1 12-3	1 12-4	1 09-0	4-9 0-4	10-9 0-8	16-9 1-3
50	1 12-5	1 12-7	1 09-2	5-0 0-4	11-0 0-8	17-0 1-3
51	1 12-8	1 12-9	1 09-4	5-1 0-4	11-1 0-8	17-1 1-3
52	1 13-0	1 13-2	1 09-7	5-2 0-4	11-2 0-8	17-2 1-3
53	1 13-3	1 13-5	1 09-9	5-3 0-4	11-3 0-8	17-3 1-3
54	1 13-5	1 13-7	1 10-2	5-4 0-4	11-4 0-9	17-4 1-3
55	1 13-8	1 14-0	1 10-4	5-5 0-4	11-5 0-9	17-5 1-3
56	1 14-0	1 14-2	1 10-6	5-6 0-4	11-6 0-9	17-6 1-3
57	1 14-3	1 14-5	1 10-9	5-7 0-4	11-7 0-9	17-7 1-3
58	1 14-5	1 14-7	1 11-1	5-8 0-4	11-8 0-9	17-8 1-3
59	1 14-8	1 15-0	1 11-3	5-9 0-4	11-9 0-9	17-9 1-3
60	1 15-0	1 15-2	1 11-6	6-0 0-5	12-0 0-9	18-0 1-4

^m 5	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	1 15-0	1 15-2	1 11-6	0-0 0-0	6-0 0-6	12-0 1-1
01	1 15-3	1 15-5	1 11-8	0-1 0-0	6-1 0-6	12-1 1-1
02	1 15-5	1 15-7	1 12-1	0-2 0-0	6-2 0-6	12-2 1-1
03	1 15-8	1 16-0	1 12-3	0-3 0-0	6-3 0-6	12-3 1-1
04	1 16-0	1 16-2	1 12-5	0-4 0-0	6-4 0-6	12-4 1-1
05	1 16-3	1 16-5	1 12-8	0-5 0-0	6-5 0-6	12-5 1-1
06	1 16-5	1 16-7	1 13-0	0-6 0-1	6-6 0-6	12-6 1-2
07	1 16-8	1 17-0	1 13-3	0-7 0-1	6-7 0-6	12-7 1-2
08	1 17-0	1 17-2	1 13-5	0-8 0-1	6-8 0-6	12-8 1-2
09	1 17-3	1 17-5	1 13-7	0-9 0-1	6-9 0-6	12-9 1-2
10	1 17-5	1 17-7	1 14-0	1-0 0-1	7-0 0-6	13-0 1-2
11	1 17-8	1 18-0	1 14-2	1-1 0-1	7-1 0-7	13-1 1-2
12	1 18-0	1 18-2	1 14-4	1-2 0-1	7-2 0-7	13-2 1-2
13	1 18-3	1 18-5	1 14-7	1-3 0-1	7-3 0-7	13-3 1-2
14	1 18-5	1 18-7	1 14-9	1-4 0-1	7-4 0-7	13-4 1-2
15	1 18-8	1 19-0	1 15-2	1-5 0-1	7-5 0-7	13-5 1-2
16	1 19-0	1 19-2	1 15-4	1-6 0-1	7-6 0-7	13-6 1-2
17	1 19-3	1 19-5	1 15-6	1-7 0-2	7-7 0-7	13-7 1-3
18	1 19-5	1 19-7	1 15-9	1-8 0-2	7-8 0-7	13-8 1-3
19	1 19-8	1 20-0	1 16-1	1-9 0-2	7-9 0-7	13-9 1-3
20	1 20-0	1 20-2	1 16-4	2-0 0-2	8-0 0-7	14-0 1-3
21	1 20-3	1 20-5	1 16-6	2-1 0-2	8-1 0-7	14-1 1-3
22	1 20-5	1 20-7	1 16-8	2-2 0-2	8-2 0-8	14-2 1-3
23	1 20-8	1 21-0	1 17-1	2-3 0-2	8-3 0-8	14-3 1-3
24	1 21-0	1 21-2	1 17-3	2-4 0-2	8-4 0-8	14-4 1-3
25	1 21-3	1 21-5	1 17-5	2-5 0-2	8-5 0-8	14-5 1-3
26	1 21-5	1 21-7	1 17-8	2-6 0-2	8-6 0-8	14-6 1-3
27	1 21-8	1 22-0	1 18-0	2-7 0-2	8-7 0-8	14-7 1-3
28	1 22-0	1 22-2	1 18-3	2-8 0-3	8-8 0-8	14-8 1-4
29	1 22-3	1 22-5	1 18-5	2-9 0-3	8-9 0-8	14-9 1-4
30	1 22-5	1 22-7	1 18-7	3-0 0-3	9-0 0-8	15-0 1-4
31	1 22-8	1 23-0	1 19-0	3-1 0-3	9-1 0-8	15-1 1-4
32	1 23-0	1 23-2	1 19-2	3-2 0-3	9-2 0-8	15-2 1-4
33	1 23-3	1 23-5	1 19-5	3-3 0-3	9-3 0-9	15-3 1-4
34	1 23-5	1 23-7	1 19-7	3-4 0-3	9-4 0-9	15-4 1-4
35	1 23-8	1 24-0	1 19-9	3-5 0-3	9-5 0-9	15-5 1-4
36	1 24-0	1 24-2	1 20-2	3-6 0-3	9-6 0-9	15-6 1-4
37	1 24-3	1 24-5	1 20-4	3-7 0-3	9-7 0-9	15-7 1-4
38	1 24-5	1 24-7	1 20-7	3-8 0-3	9-8 0-9	15-8 1-4
39	1 24-8	1 25-0	1 20-9	3-9 0-4	9-9 0-9	15-9 1-5
40	1 25-0	1 25-2	1 21-1	4-0 0-4	10-0 0-9	16-0 1-5
41	1 25-3	1 25-5	1 21-4	4-1 0-4	10-1 0-9	16-1 1-5
42	1 25-5	1 25-7	1 21-6	4-2 0-4	10-2 0-9	16-2 1-5
43	1 25-8	1 26-0	1 21-8	4-3 0-4	10-3 0-9	16-3 1-5
44	1 26-0	1 26-2	1 22-1	4-4 0-4	10-4 1-0	16-4 1-5
45	1 26-3	1 26-5	1 22-3	4-5 0-4	10-5 1-0	16-5 1-5
46	1 26-5	1 26-7	1 22-6	4-6 0-4	10-6 1-0	16-6 1-5
47	1 26-8	1 27-0	1 22-8	4-7 0-4	10-7 1-0	16-7 1-5
48	1 27-0	1 27-2	1 23-0	4-8 0-4	10-8 1-0	16-8 1-5
49	1 27-3	1 27-5	1 23-3	4-9 0-4	10-9 1-0	16-9 1-5
50	1 27-5	1 27-7	1 23-5	5-0 0-5	11-0 1-0	17-0 1-6
51	1 27-8	1 28-0	1 23-8	5-1 0-5	11-1 1-0	17-1 1-6
52	1 28-0	1 28-2	1 24-0	5-2 0-5	11-2 1-0	17-2 1-6
53	1 28-3	1 28-5	1 24-2	5-3 0-5	11-3 1-0	17-3 1-6
54	1 28-5	1 28-7	1 24-5	5-4 0-5	11-4 1-0	17-4 1-6
55	1 28-8	1 29-0	1 24-7	5-5 0-5	11-5 1-1	17-5 1-6
56	1 29-0	1 29-2	1 24-9	5-6 0-5	11-6 1-1	17-6 1-6
57	1 29-3	1 29-5	1 25-2	5-7 0-5	11-7 1-1	17-7 1-6
58	1 29-5	1 29-7	1 25-4	5-8 0-5	11-8 1-1	17-8 1-6
59	1 29-8	1 30-0	1 25-7	5-9 0-5	11-9 1-1	17-9 1-6
60	1 30-0	1 30-2	1 25-9	6-0 0-6	12-0 1-1	18-0 1-7

^m 6	SUN PLANETS	ARIES	MOON	^v or d Corr ⁿ	^v or d Corr ⁿ	^v or d Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	1 30.0	1 30.2	1 25.9	0.0 0.0	6.0 0.7	12.0 1.3
01	1 30.3	1 30.5	1 26.1	0.1 0.0	6.1 0.7	12.1 1.3
02	1 30.5	1 30.7	1 26.4	0.2 0.0	6.2 0.7	12.2 1.3
03	1 30.8	1 31.0	1 26.6	0.3 0.0	6.3 0.7	12.3 1.3
04	1 31.0	1 31.2	1 26.9	0.4 0.0	6.4 0.7	12.4 1.3
05	1 31.3	1 31.5	1 27.1	0.5 0.1	6.5 0.7	12.5 1.4
06	1 31.5	1 31.8	1 27.3	0.6 0.1	6.6 0.7	12.6 1.4
07	1 31.8	1 32.0	1 27.6	0.7 0.1	6.7 0.7	12.7 1.4
08	1 32.0	1 32.3	1 27.8	0.8 0.1	6.8 0.7	12.8 1.4
09	1 32.3	1 32.5	1 28.0	0.9 0.1	6.9 0.7	12.9 1.4
10	1 32.5	1 32.8	1 28.3	1.0 0.1	7.0 0.8	13.0 1.4
11	1 32.8	1 33.0	1 28.5	1.1 0.1	7.1 0.8	13.1 1.4
12	1 33.0	1 33.3	1 28.8	1.2 0.1	7.2 0.8	13.2 1.4
13	1 33.3	1 33.5	1 29.0	1.3 0.1	7.3 0.8	13.3 1.4
14	1 33.5	1 33.8	1 29.2	1.4 0.2	7.4 0.8	13.4 1.5
15	1 33.8	1 34.0	1 29.5	1.5 0.2	7.5 0.8	13.5 1.5
16	1 34.0	1 34.3	1 29.7	1.6 0.2	7.6 0.8	13.6 1.5
17	1 34.3	1 34.5	1 30.0	1.7 0.2	7.7 0.8	13.7 1.5
18	1 34.5	1 34.8	1 30.2	1.8 0.2	7.8 0.8	13.8 1.5
19	1 34.8	1 35.0	1 30.4	1.9 0.2	7.9 0.9	13.9 1.5
20	1 35.0	1 35.3	1 30.7	2.0 0.2	8.0 0.9	14.0 1.5
21	1 35.3	1 35.5	1 30.9	2.1 0.2	8.1 0.9	14.1 1.5
22	1 35.5	1 35.8	1 31.1	2.2 0.2	8.2 0.9	14.2 1.5
23	1 35.8	1 36.0	1 31.4	2.3 0.2	8.3 0.9	14.3 1.5
24	1 36.0	1 36.3	1 31.6	2.4 0.3	8.4 0.9	14.4 1.6
25	1 36.3	1 36.5	1 31.9	2.5 0.3	8.5 0.9	14.5 1.6
26	1 36.5	1 36.8	1 32.1	2.6 0.3	8.6 0.9	14.6 1.6
27	1 36.8	1 37.0	1 32.3	2.7 0.3	8.7 0.9	14.7 1.6
28	1 37.0	1 37.3	1 32.6	2.8 0.3	8.8 1.0	14.8 1.6
29	1 37.3	1 37.5	1 32.8	2.9 0.3	8.9 1.0	14.9 1.6
30	1 37.5	1 37.8	1 33.1	3.0 0.3	9.0 1.0	15.0 1.6
31	1 37.8	1 38.0	1 33.3	3.1 0.3	9.1 1.0	15.1 1.6
32	1 38.0	1 38.3	1 33.5	3.2 0.3	9.2 1.0	15.2 1.6
33	1 38.3	1 38.5	1 33.8	3.3 0.4	9.3 1.0	15.3 1.7
34	1 38.5	1 38.8	1 34.0	3.4 0.4	9.4 1.0	15.4 1.7
35	1 38.8	1 39.0	1 34.3	3.5 0.4	9.5 1.0	15.5 1.7
36	1 39.0	1 39.3	1 34.5	3.6 0.4	9.6 1.0	15.6 1.7
37	1 39.3	1 39.5	1 34.7	3.7 0.4	9.7 1.1	15.7 1.7
38	1 39.5	1 39.8	1 35.0	3.8 0.4	9.8 1.1	15.8 1.7
39	1 39.8	1 40.0	1 35.2	3.9 0.4	9.9 1.1	15.9 1.7
40	1 40.0	1 40.3	1 35.4	4.0 0.4	10.0 1.1	16.0 1.7
41	1 40.3	1 40.5	1 35.7	4.1 0.4	10.1 1.1	16.1 1.7
42	1 40.5	1 40.8	1 35.9	4.2 0.5	10.2 1.1	16.2 1.8
43	1 40.8	1 41.0	1 36.2	4.3 0.5	10.3 1.1	16.3 1.8
44	1 41.0	1 41.3	1 36.4	4.4 0.5	10.4 1.1	16.4 1.8
45	1 41.3	1 41.5	1 36.6	4.5 0.5	10.5 1.1	16.5 1.8
46	1 41.5	1 41.8	1 36.9	4.6 0.5	10.6 1.1	16.6 1.8
47	1 41.8	1 42.0	1 37.1	4.7 0.5	10.7 1.2	16.7 1.8
48	1 42.0	1 42.3	1 37.4	4.8 0.5	10.8 1.2	16.8 1.8
49	1 42.3	1 42.5	1 37.6	4.9 0.5	10.9 1.2	16.9 1.8
50	1 42.5	1 42.8	1 37.8	5.0 0.5	11.0 1.2	17.0 1.8
51	1 42.8	1 43.0	1 38.1	5.1 0.6	11.1 1.2	17.1 1.9
52	1 43.0	1 43.3	1 38.3	5.2 0.6	11.2 1.2	17.2 1.9
53	1 43.3	1 43.5	1 38.5	5.3 0.6	11.3 1.2	17.3 1.9
54	1 43.5	1 43.8	1 38.8	5.4 0.6	11.4 1.2	17.4 1.9
55	1 43.8	1 44.0	1 39.0	5.5 0.6	11.5 1.2	17.5 1.9
56	1 44.0	1 44.3	1 39.3	5.6 0.6	11.6 1.3	17.6 1.9
57	1 44.3	1 44.5	1 39.5	5.7 0.6	11.7 1.3	17.7 1.9
58	1 44.5	1 44.8	1 39.7	5.8 0.6	11.8 1.3	17.8 1.9
59	1 44.8	1 45.0	1 40.0	5.9 0.6	11.9 1.3	17.9 1.9
60	1 45.0	1 45.3	1 40.2	6.0 0.7	12.0 1.3	18.0 2.0

^m 7	SUN PLANETS	ARIES	MOON	^v or d Corr ⁿ	^v or d Corr ⁿ	^v or d Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	1 45.0	1 45.3	1 40.2	0.0 0.0	6.0 0.8	12.0 1.5
01	1 45.3	1 45.5	1 40.5	0.1 0.0	6.1 0.8	12.1 1.5
02	1 45.5	1 45.8	1 40.7	0.2 0.0	6.2 0.8	12.2 1.5
03	1 45.8	1 46.0	1 40.9	0.3 0.0	6.3 0.8	12.3 1.5
04	1 46.0	1 46.3	1 41.2	0.4 0.1	6.4 0.8	12.4 1.6
05	1 46.3	1 46.5	1 41.4	0.5 0.1	6.5 0.8	12.5 1.6
06	1 46.5	1 46.8	1 41.6	0.6 0.1	6.6 0.8	12.6 1.6
07	1 46.8	1 47.0	1 41.9	0.7 0.1	6.7 0.8	12.7 1.6
08	1 47.0	1 47.3	1 42.1	0.8 0.1	6.8 0.9	12.8 1.6
09	1 47.3	1 47.5	1 42.4	0.9 0.1	6.9 0.9	12.9 1.6
10	1 47.5	1 47.8	1 42.6	1.0 0.1	7.0 0.9	13.0 1.6
11	1 47.8	1 48.0	1 42.8	1.1 0.1	7.1 0.9	13.1 1.6
12	1 48.0	1 48.3	1 43.1	1.2 0.2	7.2 0.9	13.2 1.7
13	1 48.3	1 48.5	1 43.3	1.3 0.2	7.3 0.9	13.3 1.7
14	1 48.5	1 48.8	1 43.6	1.4 0.2	7.4 0.9	13.4 1.7
15	1 48.8	1 49.0	1 43.8	1.5 0.2	7.5 0.9	13.5 1.7
16	1 49.0	1 49.3	1 44.0	1.6 0.2	7.6 1.0	13.6 1.7
17	1 49.3	1 49.5	1 44.3	1.7 0.2	7.7 1.0	13.7 1.7
18	1 49.5	1 49.8	1 44.5	1.8 0.2	7.8 1.0	13.8 1.7
19	1 49.8	1 50.1	1 44.8	1.9 0.2	7.9 1.0	13.9 1.7
20	1 50.0	1 50.3	1 45.0	2.0 0.3	8.0 1.0	14.0 1.8
21	1 50.3	1 50.6	1 45.2	2.1 0.3	8.1 1.0	14.1 1.8
22	1 50.5	1 50.8	1 45.5	2.2 0.3	8.2 1.0	14.2 1.8
23	1 50.8	1 51.1	1 45.7	2.3 0.3	8.3 1.0	14.3 1.8
24	1 51.0	1 51.3	1 45.9	2.4 0.3	8.4 1.1	14.4 1.8
25	1 51.3	1 51.6	1 46.2	2.5 0.3	8.5 1.1	14.5 1.8
26	1 51.5	1 51.8	1 46.4	2.6 0.3	8.6 1.1	14.6 1.8
27	1 51.8	1 52.1	1 46.7	2.7 0.3	8.7 1.1	14.7 1.8
28	1 52.0	1 52.3	1 46.9	2.8 0.4	8.8 1.1	14.8 1.9
29	1 52.3	1 52.6	1 47.1	2.9 0.4	8.9 1.1	14.9 1.9
30	1 52.5	1 52.8	1 47.4	3.0 0.4	9.0 1.1	15.0 1.9
31	1 52.8	1 53.1	1 47.6	3.1 0.4	9.1 1.1	15.1 1.9
32	1 53.0	1 53.3	1 47.9	3.2 0.4	9.2 1.2	15.2 1.9
33	1 53.3	1 53.6	1 48.1	3.3 0.4	9.3 1.2	15.3 1.9
34	1 53.5	1 53.8	1 48.3	3.4 0.4	9.4 1.2	15.4 1.9
35	1 53.8	1 54.1	1 48.6	3.5 0.4	9.5 1.2	15.5 1.9
36	1 54.0	1 54.3	1 48.8	3.6 0.5	9.6 1.2	15.6 2.0
37	1 54.3	1 54.6	1 49.0	3.7 0.5	9.7 1.2	15.7 2.0
38	1 54.5	1 54.8	1 49.3	3.8 0.5	9.8 1.2	15.8 2.0
39	1 54.8	1 55.1	1 49.5	3.9 0.5	9.9 1.2	15.9 2.0
40	1 55.0	1 55.3	1 49.8	4.0 0.5	10.0 1.3	16.0 2.0
41	1 55.3	1 55.6	1 50.0	4.1 0.5	10.1 1.3	16.1 2.0
42	1 55.5	1 55.8	1 50.2	4.2 0.5	10.2 1.3	16.2 2.0
43	1 55.8	1 56.1	1 50.5	4.3 0.5	10.3 1.3	16.3 2.0
44	1 56.0	1 56.3	1 50.7	4.4 0.6	10.4 1.3	16.4 2.1
45	1 56.3	1 56.6	1 51.0	4.5 0.6	10.5 1.3	16.5 2.1
46	1 56.5	1 56.8	1 51.2	4.6 0.6	10.6 1.3	16.6 2.1
47	1 56.8	1 57.1	1 51.4	4.7 0.6	10.7 1.3	16.7 2.1
48	1 57.0	1 57.3	1 51.7	4.8 0.6	10.8 1.4	16.8 2.1
49	1 57.3	1 57.6	1 51.9	4.9 0.6	10.9 1.4	16.9 2.1
50	1 57.5	1 57.8	1 52.1	5.0 0.6	11.0 1.4	17.0 2.1
51	1 57.8	1 58.1	1 52.4	5.1 0.6	11.1 1.4	17.1 2.1
52	1 58.0	1 58.3	1 52.6	5.2 0.7	11.2 1.4	17.2 2.2
53	1 58.3	1 58.6	1 52.9	5.3 0.7	11.3 1.4	17.3 2.2
54	1 58.5	1 58.8	1 53.1	5.4 0.7	11.4 1.4	17.4 2.2
55	1 58.8	1 59.1	1 53.3	5.5 0.7	11.5 1.4	17.5 2.2
56	1 59.0	1 59.3	1 53.6	5.6 0.7	11.6 1.5	17.6 2.2
57	1 59.3	1 59.6	1 53.8	5.7 0.7	11.7 1.5	17.7 2.2
58	1 59.5	1 59.8	1 54.1	5.8 0.7	11.8 1.5	17.8 2.2
59	1 59.8	2 00.1	1 54.3	5.9 0.7	11.9 1.5	17.9 2.2
60	2 00.0	2 00.3	1 54.5	6.0 0.8	12.0 1.5	18.0 2.3

8 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	9 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /
00	2 00:0	2 00:3	1 54:5	0:0 0:0	6:0 0:9	12:0 1:7	00	2 15:0	2 15:4	2 08:9	0:0 0:0	6:0 1:0	12:0 1:9
01	2 00:3	2 00:6	1 54:8	0:1 0:0	6:1 0:9	12:1 1:7	01	2 15:3	2 15:6	2 09:1	0:1 0:0	6:1 1:0	12:1 1:9
02	2 00:5	2 00:8	1 55:0	0:2 0:0	6:2 0:9	12:2 1:7	02	2 15:5	2 15:9	2 09:3	0:2 0:0	6:2 1:0	12:2 1:9
03	2 00:8	2 01:1	1 55:2	0:3 0:0	6:3 0:9	12:3 1:7	03	2 15:8	2 16:1	2 09:6	0:3 0:0	6:3 1:0	12:3 1:9
04	2 01:0	2 01:3	1 55:5	0:4 0:1	6:4 0:9	12:4 1:8	04	2 16:0	2 16:4	2 09:8	0:4 0:1	6:4 1:0	12:4 2:0
05	2 01:3	2 01:6	1 55:7	0:5 0:1	6:5 0:9	12:5 1:8	05	2 16:3	2 16:6	2 10:0	0:5 0:1	6:5 1:0	12:5 2:0
06	2 01:5	2 01:8	1 56:0	0:6 0:1	6:6 0:9	12:6 1:8	06	2 16:5	2 16:9	2 10:3	0:6 0:1	6:6 1:0	12:6 2:0
07	2 01:8	2 02:1	1 56:2	0:7 0:1	6:7 0:9	12:7 1:8	07	2 16:8	2 17:1	2 10:5	0:7 0:1	6:7 1:1	12:7 2:0
08	2 02:0	2 02:3	1 56:4	0:8 0:1	6:8 1:0	12:8 1:8	08	2 17:0	2 17:4	2 10:8	0:8 0:1	6:8 1:1	12:8 2:0
09	2 02:3	2 02:6	1 56:7	0:9 0:1	6:9 1:0	12:9 1:8	09	2 17:3	2 17:6	2 11:0	0:9 0:1	6:9 1:1	12:9 2:0
10	2 02:5	2 02:8	1 56:9	1:0 0:1	7:0 1:0	13:0 1:8	10	2 17:5	2 17:9	2 11:2	1:0 0:2	7:0 1:1	13:0 2:1
11	2 02:8	2 03:1	1 57:2	1:1 0:2	7:1 1:0	13:1 1:9	11	2 17:8	2 18:1	2 11:5	1:1 0:2	7:1 1:1	13:1 2:1
12	2 03:0	2 03:3	1 57:4	1:2 0:2	7:2 1:0	13:2 1:9	12	2 18:0	2 18:4	2 11:7	1:2 0:2	7:2 1:1	13:2 2:1
13	2 03:3	2 03:6	1 57:6	1:3 0:2	7:3 1:0	13:3 1:9	13	2 18:3	2 18:6	2 12:0	1:3 0:2	7:3 1:2	13:3 2:1
14	2 03:5	2 03:8	1 57:9	1:4 0:2	7:4 1:0	13:4 1:9	14	2 18:5	2 18:9	2 12:2	1:4 0:2	7:4 1:2	13:4 2:1
15	2 03:8	2 04:1	1 58:1	1:5 0:2	7:5 1:1	13:5 1:9	15	2 18:8	2 19:1	2 12:4	1:5 0:2	7:5 1:2	13:5 2:1
16	2 04:0	2 04:3	1 58:4	1:6 0:2	7:6 1:1	13:6 1:9	16	2 19:0	2 19:4	2 12:7	1:6 0:3	7:6 1:2	13:6 2:2
17	2 04:3	2 04:6	1 58:6	1:7 0:2	7:7 1:1	13:7 1:9	17	2 19:3	2 19:6	2 12:9	1:7 0:3	7:7 1:2	13:7 2:2
18	2 04:5	2 04:8	1 58:8	1:8 0:3	7:8 1:1	13:8 2:0	18	2 19:5	2 19:9	2 13:1	1:8 0:3	7:8 1:2	13:8 2:2
19	2 04:8	2 05:1	1 59:1	1:9 0:3	7:9 1:1	13:9 2:0	19	2 19:8	2 20:1	2 13:4	1:9 0:3	7:9 1:3	13:9 2:2
20	2 05:0	2 05:3	1 59:3	2:0 0:3	8:0 1:1	14:0 2:0	20	2 20:0	2 20:4	2 13:6	2:0 0:3	8:0 1:3	14:0 2:2
21	2 05:3	2 05:6	1 59:5	2:1 0:3	8:1 1:1	14:1 2:0	21	2 20:3	2 20:6	2 13:9	2:1 0:3	8:1 1:3	14:1 2:2
22	2 05:5	2 05:8	1 59:8	2:2 0:3	8:2 1:2	14:2 2:0	22	2 20:5	2 20:9	2 14:1	2:2 0:3	8:2 1:3	14:2 2:2
23	2 05:8	2 06:1	2 00:0	2:3 0:3	8:3 1:2	14:3 2:0	23	2 20:8	2 21:1	2 14:3	2:3 0:4	8:3 1:3	14:3 2:3
24	2 06:0	2 06:3	2 00:3	2:4 0:3	8:4 1:2	14:4 2:0	24	2 21:0	2 21:4	2 14:6	2:4 0:4	8:4 1:3	14:4 2:3
25	2 06:3	2 06:6	2 00:5	2:5 0:4	8:5 1:2	14:5 2:1	25	2 21:3	2 21:6	2 14:8	2:5 0:4	8:5 1:3	14:5 2:3
26	2 06:5	2 06:8	2 00:7	2:6 0:4	8:6 1:2	14:6 2:1	26	2 21:5	2 21:9	2 15:1	2:6 0:4	8:6 1:4	14:6 2:3
27	2 06:8	2 07:1	2 01:0	2:7 0:4	8:7 1:2	14:7 2:1	27	2 21:8	2 22:1	2 15:3	2:7 0:4	8:7 1:4	14:7 2:3
28	2 07:0	2 07:3	2 01:2	2:8 0:4	8:8 1:2	14:8 2:1	28	2 22:0	2 22:4	2 15:5	2:8 0:4	8:8 1:4	14:8 2:3
29	2 07:3	2 07:6	2 01:5	2:9 0:4	8:9 1:3	14:9 2:1	29	2 22:3	2 22:6	2 15:8	2:9 0:5	8:9 1:4	14:9 2:4
30	2 07:5	2 07:8	2 01:7	3:0 0:4	9:0 1:3	15:0 2:1	30	2 22:5	2 22:9	2 16:0	3:0 0:5	9:0 1:4	15:0 2:4
31	2 07:8	2 08:1	2 01:9	3:1 0:4	9:1 1:3	15:1 2:1	31	2 22:8	2 23:1	2 16:2	3:1 0:5	9:1 1:4	15:1 2:4
32	2 08:0	2 08:4	2 02:2	3:2 0:5	9:2 1:3	15:2 2:2	32	2 23:0	2 23:4	2 16:5	3:2 0:5	9:2 1:5	15:2 2:4
33	2 08:3	2 08:6	2 02:4	3:3 0:5	9:3 1:3	15:3 2:2	33	2 23:3	2 23:6	2 16:7	3:3 0:5	9:3 1:5	15:3 2:4
34	2 08:5	2 08:9	2 02:6	3:4 0:5	9:4 1:3	15:4 2:2	34	2 23:5	2 23:9	2 17:0	3:4 0:5	9:4 1:5	15:4 2:4
35	2 08:8	2 09:1	2 02:9	3:5 0:5	9:5 1:3	15:5 2:2	35	2 23:8	2 24:1	2 17:2	3:5 0:6	9:5 1:5	15:5 2:5
36	2 09:0	2 09:4	2 03:1	3:6 0:5	9:6 1:4	15:6 2:2	36	2 24:0	2 24:4	2 17:4	3:6 0:6	9:6 1:5	15:6 2:5
37	2 09:3	2 09:6	2 03:4	3:7 0:5	9:7 1:4	15:7 2:2	37	2 24:3	2 24:6	2 17:7	3:7 0:6	9:7 1:5	15:7 2:5
38	2 09:5	2 09:9	2 03:6	3:8 0:5	9:8 1:4	15:8 2:2	38	2 24:5	2 24:9	2 17:9	3:8 0:6	9:8 1:6	15:8 2:5
39	2 09:8	2 10:1	2 03:8	3:9 0:6	9:9 1:4	15:9 2:3	39	2 24:8	2 25:1	2 18:2	3:9 0:6	9:9 1:6	15:9 2:5
40	2 10:0	2 10:4	2 04:1	4:0 0:6	10:0 1:4	16:0 2:3	40	2 25:0	2 25:4	2 18:4	4:0 0:6	10:0 1:6	16:0 2:5
41	2 10:3	2 10:6	2 04:3	4:1 0:6	10:1 1:4	16:1 2:3	41	2 25:3	2 25:6	2 18:6	4:1 0:6	10:1 1:6	16:1 2:5
42	2 10:5	2 10:9	2 04:6	4:2 0:6	10:2 1:4	16:2 2:3	42	2 25:5	2 25:9	2 18:9	4:2 0:7	10:2 1:6	16:2 2:6
43	2 10:8	2 11:1	2 04:8	4:3 0:6	10:3 1:5	16:3 2:3	43	2 25:8	2 26:1	2 19:1	4:3 0:7	10:3 1:6	16:3 2:6
44	2 11:0	2 11:4	2 05:0	4:4 0:6	10:4 1:5	16:4 2:3	44	2 26:0	2 26:4	2 19:3	4:4 0:7	10:4 1:6	16:4 2:6
45	2 11:3	2 11:6	2 05:3	4:5 0:6	10:5 1:5	16:5 2:3	45	2 26:3	2 26:7	2 19:6	4:5 0:7	10:5 1:7	16:5 2:6
46	2 11:5	2 11:9	2 05:5	4:6 0:7	10:6 1:5	16:6 2:4	46	2 26:5	2 26:9	2 19:8	4:6 0:7	10:6 1:7	16:6 2:6
47	2 11:8	2 12:1	2 05:7	4:7 0:7	10:7 1:5	16:7 2:4	47	2 26:8	2 27:2	2 20:1	4:7 0:7	10:7 1:7	16:7 2:6
48	2 12:0	2 12:4	2 06:0	4:8 0:7	10:8 1:5	16:8 2:4	48	2 27:0	2 27:4	2 20:3	4:8 0:8	10:8 1:7	16:8 2:7
49	2 12:3	2 12:6	2 06:2	4:9 0:7	10:9 1:5	16:9 2:4	49	2 27:3	2 27:7	2 20:5	4:9 0:8	10:9 1:7	16:9 2:7
50	2 12:5	2 12:9	2 06:5	5:0 0:7	11:0 1:6	17:0 2:4	50	2 27:5	2 27:9	2 20:8	5:0 0:8	11:0 1:7	17:0 2:7
51	2 12:8	2 13:1	2 06:7	5:1 0:7	11:1 1:6	17:1 2:4	51	2 27:8	2 28:2	2 21:0	5:1 0:8	11:1 1:8	17:1 2:7
52	2 13:0	2 13:4	2 06:9	5:2 0:7	11:2 1:6	17:2 2:4	52	2 28:0	2 28:4	2 21:3	5:2 0:8	11:2 1:8	17:2 2:7
53	2 13:3	2 13:6	2 07:2	5:3 0:8	11:3 1:6	17:3 2:5	53	2 28:3	2 28:7	2 21:5	5:3 0:8	11:3 1:8	17:3 2:7
54	2 13:5	2 13:9	2 07:4	5:4 0:8	11:4 1:6	17:4 2:5	54	2 28:5	2 28:9	2 21:7	5:4 0:9	11:4 1:8	17:4 2:8
55	2 13:8	2 14:1	2 07:7	5:5 0:8	11:5 1:6	17:5 2:5	55	2 28:8	2 29:2	2 22:0	5:5 0:9	11:5 1:8	17:5 2:8
56	2 14:0	2 14:4	2 07:9	5:6 0:8	11:6 1:6	17:6 2:5	56	2 29:0	2 29:4	2 22:2	5:6 0:9	11:6 1:8	17:6 2:8
57	2 14:3	2 14:6	2 08:1	5:7 0:8	11:7 1:7	17:7 2:5	57	2 29:3	2 29:7	2 22:5	5:7 0:9	11:7 1:9	17:7 2:8
58	2 14:5	2 14:9	2 08:4	5:8 0:8	11:8 1:7	17:8 2:5	58	2 29:5	2 29:9	2 22:7	5:8 0:9	11:8 1:9	17:8 2:8
59	2 14:8	2 15:1	2 08:6	5:9 0:8	11:9 1:7	17:9 2:5	59	2 29:8	2 30:2	2 22:9	5:9 0:9	11:9 1:9	17:9 2:8
60	2 15:0	2 15:4	2 08:9	6:0 0:9	12:0 1:7	18:0 2:6	60	2 30:0	2 30:4	2 23:2	6:0 1:0	12:0 1:9	18:0 2:9

^m 10	SUN PLANETS	ARIES	MOON	^r or d	Corr ⁿ	^r or d	Corr ⁿ	^r or d	Corr ⁿ
s	o /	o /	o /	d /	d /	d /	d /	d /	d /
00	2 30.0	2 30.4	2 23.2	0.0	0.0	6.0	1.1	12.0	2.1
01	2 30.3	2 30.7	2 23.4	0.1	0.0	6.1	1.1	12.1	2.1
02	2 30.5	2 30.9	2 23.6	0.2	0.0	6.2	1.1	12.2	2.1
03	2 30.8	2 31.2	2 23.9	0.3	0.1	6.3	1.1	12.3	2.2
04	2 31.0	2 31.4	2 24.1	0.4	0.1	6.4	1.1	12.4	2.2
05	2 31.3	2 31.7	2 24.4	0.5	0.1	6.5	1.1	12.5	2.2
06	2 31.5	2 31.9	2 24.6	0.6	0.1	6.6	1.2	12.6	2.2
07	2 31.8	2 32.2	2 24.8	0.7	0.1	6.7	1.2	12.7	2.2
08	2 32.0	2 32.4	2 25.1	0.8	0.1	6.8	1.2	12.8	2.2
09	2 32.3	2 32.7	2 25.3	0.9	0.2	6.9	1.2	12.9	2.3
10	2 32.5	2 32.9	2 25.6	1.0	0.2	7.0	1.2	13.0	2.3
11	2 32.8	2 33.2	2 25.8	1.1	0.2	7.1	1.2	13.1	2.3
12	2 33.0	2 33.4	2 26.0	1.2	0.2	7.2	1.3	13.2	2.3
13	2 33.3	2 33.7	2 26.3	1.3	0.2	7.3	1.3	13.3	2.3
14	2 33.5	2 33.9	2 26.5	1.4	0.2	7.4	1.3	13.4	2.3
15	2 33.8	2 34.2	2 26.7	1.5	0.3	7.5	1.3	13.5	2.4
16	2 34.0	2 34.4	2 27.0	1.6	0.3	7.6	1.3	13.6	2.4
17	2 34.3	2 34.7	2 27.2	1.7	0.3	7.7	1.3	13.7	2.4
18	2 34.5	2 34.9	2 27.5	1.8	0.3	7.8	1.4	13.8	2.4
19	2 34.8	2 35.2	2 27.7	1.9	0.3	7.9	1.4	13.9	2.4
20	2 35.0	2 35.4	2 27.9	2.0	0.4	8.0	1.4	14.0	2.5
21	2 35.3	2 35.7	2 28.2	2.1	0.4	8.1	1.4	14.1	2.5
22	2 35.5	2 35.9	2 28.4	2.2	0.4	8.2	1.4	14.2	2.5
23	2 35.8	2 36.2	2 28.7	2.3	0.4	8.3	1.5	14.3	2.5
24	2 36.0	2 36.4	2 28.9	2.4	0.4	8.4	1.5	14.4	2.5
25	2 36.3	2 36.7	2 29.1	2.5	0.4	8.5	1.5	14.5	2.5
26	2 36.5	2 36.9	2 29.4	2.6	0.5	8.6	1.5	14.6	2.6
27	2 36.8	2 37.2	2 29.6	2.7	0.5	8.7	1.5	14.7	2.6
28	2 37.0	2 37.4	2 29.8	2.8	0.5	8.8	1.5	14.8	2.6
29	2 37.3	2 37.7	2 30.1	2.9	0.5	8.9	1.6	14.9	2.6
30	2 37.5	2 37.9	2 30.3	3.0	0.5	9.0	1.6	15.0	2.6
31	2 37.8	2 38.2	2 30.6	3.1	0.5	9.1	1.6	15.1	2.6
32	2 38.0	2 38.4	2 30.8	3.2	0.6	9.2	1.6	15.2	2.7
33	2 38.3	2 38.7	2 31.0	3.3	0.6	9.3	1.6	15.3	2.7
34	2 38.5	2 38.9	2 31.3	3.4	0.6	9.4	1.6	15.4	2.7
35	2 38.8	2 39.2	2 31.5	3.5	0.6	9.5	1.7	15.5	2.7
36	2 39.0	2 39.4	2 31.8	3.6	0.6	9.6	1.7	15.6	2.7
37	2 39.3	2 39.7	2 32.0	3.7	0.6	9.7	1.7	15.7	2.7
38	2 39.5	2 39.9	2 32.2	3.8	0.7	9.8	1.7	15.8	2.8
39	2 39.8	2 40.2	2 32.5	3.9	0.7	9.9	1.7	15.9	2.8
40	2 40.0	2 40.4	2 32.7	4.0	0.7	10.0	1.8	16.0	2.8
41	2 40.3	2 40.7	2 32.9	4.1	0.7	10.1	1.8	16.1	2.8
42	2 40.5	2 40.9	2 33.2	4.2	0.7	10.2	1.8	16.2	2.8
43	2 40.8	2 41.2	2 33.4	4.3	0.8	10.3	1.8	16.3	2.9
44	2 41.0	2 41.4	2 33.7	4.4	0.8	10.4	1.8	16.4	2.9
45	2 41.3	2 41.7	2 33.9	4.5	0.8	10.5	1.8	16.5	2.9
46	2 41.5	2 41.9	2 34.1	4.6	0.8	10.6	1.9	16.6	2.9
47	2 41.8	2 42.2	2 34.4	4.7	0.8	10.7	1.9	16.7	2.9
48	2 42.0	2 42.4	2 34.6	4.8	0.8	10.8	1.9	16.8	2.9
49	2 42.3	2 42.7	2 34.9	4.9	0.9	10.9	1.9	16.9	3.0
50	2 42.5	2 42.9	2 35.1	5.0	0.9	11.0	1.9	17.0	3.0
51	2 42.8	2 43.2	2 35.3	5.1	0.9	11.1	1.9	17.1	3.0
52	2 43.0	2 43.4	2 35.6	5.2	0.9	11.2	2.0	17.2	3.0
53	2 43.3	2 43.7	2 35.8	5.3	0.9	11.3	2.0	17.3	3.0
54	2 43.5	2 43.9	2 36.1	5.4	0.9	11.4	2.0	17.4	3.0
55	2 43.8	2 44.2	2 36.3	5.5	1.0	11.5	2.0	17.5	3.1
56	2 44.0	2 44.4	2 36.5	5.6	1.0	11.6	2.0	17.6	3.1
57	2 44.3	2 44.7	2 36.8	5.7	1.0	11.7	2.0	17.7	3.1
58	2 44.5	2 45.0	2 37.0	5.8	1.0	11.8	2.1	17.8	3.1
59	2 44.8	2 45.2	2 37.2	5.9	1.0	11.9	2.1	17.9	3.1
60	2 45.0	2 45.5	2 37.5	6.0	1.1	12.0	2.1	18.0	3.2

^m 11	SUN PLANETS	ARIES	MOON	^r or d	Corr ⁿ	^r or d	Corr ⁿ	^r or d	Corr ⁿ
s	o /	o /	o /	d /	d /	d /	d /	d /	d /
00	2 45.0	2 45.5	2 37.5	0.0	0.0	6.0	1.2	12.0	2.3
01	2 45.3	2 45.7	2 37.7	0.1	0.0	6.1	1.2	12.1	2.3
02	2 45.5	2 46.0	2 38.0	0.2	0.0	6.2	1.2	12.2	2.3
03	2 45.8	2 46.2	2 38.2	0.3	0.1	6.3	1.2	12.3	2.4
04	2 46.0	2 46.5	2 38.4	0.4	0.1	6.4	1.2	12.4	2.4
05	2 46.3	2 46.7	2 38.7	0.5	0.1	6.5	1.2	12.5	2.4
06	2 46.5	2 47.0	2 38.9	0.6	0.1	6.6	1.3	12.6	2.4
07	2 46.8	2 47.2	2 39.2	0.7	0.1	6.7	1.3	12.7	2.4
08	2 47.0	2 47.5	2 39.4	0.8	0.2	6.8	1.3	12.8	2.5
09	2 47.3	2 47.7	2 39.6	0.9	0.2	6.9	1.3	12.9	2.5
10	2 47.5	2 48.0	2 39.9	1.0	0.2	7.0	1.3	13.0	2.5
11	2 47.8	2 48.2	2 40.1	1.1	0.2	7.1	1.4	13.1	2.5
12	2 48.0	2 48.5	2 40.3	1.2	0.2	7.2	1.4	13.2	2.5
13	2 48.3	2 48.7	2 40.6	1.3	0.2	7.3	1.4	13.3	2.5
14	2 48.5	2 49.0	2 40.8	1.4	0.3	7.4	1.4	13.4	2.6
15	2 48.8	2 49.2	2 41.1	1.5	0.3	7.5	1.4	13.5	2.6
16	2 49.0	2 49.5	2 41.3	1.6	0.3	7.6	1.5	13.6	2.6
17	2 49.3	2 49.7	2 41.5	1.7	0.3	7.7	1.5	13.7	2.6
18	2 49.5	2 50.0	2 41.8	1.8	0.3	7.8	1.5	13.8	2.6
19	2 49.8	2 50.2	2 42.0	1.9	0.4	7.9	1.5	13.9	2.7
20	2 50.0	2 50.5	2 42.3	2.0	0.4	8.0	1.5	14.0	2.7
21	2 50.3	2 50.7	2 42.5	2.1	0.4	8.1	1.6	14.1	2.7
22	2 50.5	2 51.0	2 42.7	2.2	0.4	8.2	1.6	14.2	2.7
23	2 50.8	2 51.2	2 43.0	2.3	0.4	8.3	1.6	14.3	2.7
24	2 51.0	2 51.5	2 43.2	2.4	0.5	8.4	1.6	14.4	2.8
25	2 51.3	2 51.7	2 43.4	2.5	0.5	8.5	1.6	14.5	2.8
26	2 51.5	2 52.0	2 43.7	2.6	0.5	8.6	1.6	14.6	2.8
27	2 51.8	2 52.2	2 43.9	2.7	0.5	8.7	1.7	14.7	2.8
28	2 52.0	2 52.5	2 44.2	2.8	0.5	8.8	1.7	14.8	2.8
29	2 52.3	2 52.7	2 44.4	2.9	0.6	8.9	1.7	14.9	2.9
30	2 52.5	2 53.0	2 44.6	3.0	0.6	9.0	1.7	15.0	2.9
31	2 52.8	2 53.2	2 44.9	3.1	0.6	9.1	1.7	15.1	2.9
32	2 53.0	2 53.5	2 45.1	3.2	0.6	9.2	1.8	15.2	2.9
33	2 53.3	2 53.7	2 45.4	3.3	0.6	9.3	1.8	15.3	2.9
34	2 53.5	2 54.0	2 45.6	3.4	0.7	9.4	1.8	15.4	3.0
35	2 53.8	2 54.2	2 45.8	3.5	0.7	9.5	1.8	15.5	3.0
36	2 54.0	2 54.5	2 46.1	3.6	0.7	9.6	1.8	15.6	3.0
37	2 54.3	2 54.7	2 46.3	3.7	0.7	9.7	1.9	15.7	3.0
38	2 54.5	2 55.0	2 46.6	3.8	0.7	9.8	1.9	15.8	3.0
39	2 54.8	2 55.2	2 46.8	3.9	0.7	9.9	1.9	15.9	3.0
40	2 55.0	2 55.5	2 47.0	4.0	0.8	10.0	1.9	16.0	3.1
41	2 55.3	2 55.7	2 47.3	4.1	0.8	10.1	1.9	16.1	3.1
42	2 55.5	2 56.0	2 47.5	4.2	0.8	10.2	2.0	16.2	3.1
43	2 55.8	2 56.2	2 47.7	4.3	0.8	10.3	2.0	16.3	3.1
44	2 56.0	2 56.5	2 48.0	4.4	0.8	10.4	2.0	16.4	3.1
45	2 56.3	2 56.7	2 48.2	4.5	0.9	10.5	2.0	16.5	3.2
46	2 56.5	2 57.0	2 48.5	4.6	0.9	10.6	2.0	16.6	3.2
47	2 56.8	2 57.2	2 48.7	4.7	0.9	10.7	2.1	16.7	3.2
48	2 57.0	2 57.5	2 48.9	4.8	0.9	10.8	2.1	16.8	3.2
49	2 57.3	2 57.7	2 49.2	4.9	0.9	10.9	2.1	16.9	3.2
50	2 57.5	2 58.0	2 49.4	5.0	1.0	11.0	2.1	17.0	3.3
51	2 57.8	2 58.2	2 49.7	5.1	1.0	11.1	2.1	17.1	3.3
52	2 58.0	2 58.5	2 49.9	5.2	1.0	11.2	2.1	17.2	3.3
53	2 58.3	2 58.7	2 50.1	5.3	1.0	11.3	2.2	17.3	3.3
54	2 58.5	2 59.0	2 50.4	5.4	1.0	11.4	2.2	17.4	3.3
55	2 58.8	2 59.2	2 50.6	5.5	1.1	11.5	2.2	17.5	3.4
56	2 59.0	2 59.5	2 50.8	5.6	1.1	11.6	2.2	17.6	3.4
57	2 59.3	2 59.7	2 51.1	5.7	1.1	11.7	2.2	17.7	3.4
58	2 59.5	3 00.0	2 51.3	5.8	1.1	11.8	2.3	17.8	3.4
59	2 59.8	3 00.2	2 51.6	5.9	1.1	11.9	2.3	17.9	3.4
60	3 00.0	3 00.5	2 51.8	6.0	1.2	12.0	2.3	18.0	3.5

12 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	13 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /
00	3 00-0	3 00-5	2 51-8	0-0 0-0	6-0 1-3	12-0 2-5	00	3 15-0	3 15-5	3 06-1	0-0 0-0	6-0 1-4	12-0 2-7
01	3 00-3	3 00-7	2 52-0	0-1 0-0	6-1 1-3	12-1 2-5	01	3 15-3	3 15-8	3 06-4	0-1 0-0	6-1 1-4	12-1 2-7
02	3 00-5	3 01-0	2 52-3	0-2 0-0	6-2 1-3	12-2 2-5	02	3 15-5	3 16-0	3 06-6	0-2 0-0	6-2 1-4	12-2 2-7
03	3 00-8	3 01-2	2 52-5	0-3 0-1	6-3 1-3	12-3 2-6	03	3 15-8	3 16-3	3 06-8	0-3 0-1	6-3 1-4	12-3 2-8
04	3 01-0	3 01-5	2 52-8	0-4 0-1	6-4 1-3	12-4 2-6	04	3 16-0	3 16-5	3 07-1	0-4 0-1	6-4 1-4	12-4 2-8
05	3 01-3	3 01-7	2 53-0	0-5 0-1	6-5 1-4	12-5 2-6	05	3 16-3	3 16-8	3 07-3	0-5 0-1	6-5 1-5	12-5 2-8
06	3 01-5	3 02-0	2 53-2	0-6 0-1	6-6 1-4	12-6 2-6	06	3 16-5	3 17-0	3 07-5	0-6 0-1	6-6 1-5	12-6 2-8
07	3 01-8	3 02-2	2 53-5	0-7 0-1	6-7 1-4	12-7 2-6	07	3 16-8	3 17-3	3 07-8	0-7 0-2	6-7 1-5	12-7 2-9
08	3 02-0	3 02-5	2 53-7	0-8 0-2	6-8 1-4	12-8 2-7	08	3 17-0	3 17-5	3 08-0	0-8 0-2	6-8 1-5	12-8 2-9
09	3 02-3	3 02-7	2 53-9	0-9 0-2	6-9 1-4	12-9 2-7	09	3 17-3	3 17-8	3 08-3	0-9 0-2	6-9 1-6	12-9 2-9
10	3 02-5	3 03-0	2 54-2	1-0 0-2	7-0 1-5	13-0 2-7	10	3 17-5	3 18-0	3 08-5	1-0 0-2	7-0 1-6	13-0 2-9
11	3 02-8	3 03-3	2 54-4	1-1 0-2	7-1 1-5	13-1 2-7	11	3 17-8	3 18-3	3 08-7	1-1 0-2	7-1 1-6	13-1 2-9
12	3 03-0	3 03-5	2 54-7	1-2 0-3	7-2 1-5	13-2 2-8	12	3 18-0	3 18-5	3 09-0	1-2 0-3	7-2 1-6	13-2 3-0
13	3 03-3	3 03-8	2 54-9	1-3 0-3	7-3 1-5	13-3 2-8	13	3 18-3	3 18-8	3 09-2	1-3 0-3	7-3 1-6	13-3 3-0
14	3 03-5	3 04-0	2 55-1	1-4 0-3	7-4 1-5	13-4 2-8	14	3 18-5	3 19-0	3 09-5	1-4 0-3	7-4 1-7	13-4 3-0
15	3 03-8	3 04-3	2 55-4	1-5 0-3	7-5 1-6	13-5 2-8	15	3 18-8	3 19-3	3 09-7	1-5 0-3	7-5 1-7	13-5 3-0
16	3 04-0	3 04-5	2 55-6	1-6 0-3	7-6 1-6	13-6 2-8	16	3 19-0	3 19-5	3 09-9	1-6 0-4	7-6 1-7	13-6 3-1
17	3 04-3	3 04-8	2 55-9	1-7 0-4	7-7 1-6	13-7 2-9	17	3 19-3	3 19-8	3 10-2	1-7 0-4	7-7 1-7	13-7 3-1
18	3 04-5	3 05-0	2 56-1	1-8 0-4	7-8 1-6	13-8 2-9	18	3 19-5	3 20-0	3 10-4	1-8 0-4	7-8 1-8	13-8 3-1
19	3 04-8	3 05-3	2 56-3	1-9 0-4	7-9 1-6	13-9 2-9	19	3 19-8	3 20-3	3 10-7	1-9 0-4	7-9 1-8	13-9 3-1
20	3 05-0	3 05-5	2 56-6	2-0 0-4	8-0 1-7	14-0 2-9	20	3 20-0	3 20-5	3 10-9	2-0 0-5	8-0 1-8	14-0 3-2
21	3 05-3	3 05-8	2 56-8	2-1 0-4	8-1 1-7	14-1 2-9	21	3 20-3	3 20-8	3 11-1	2-1 0-5	8-1 1-8	14-1 3-2
22	3 05-5	3 06-0	2 57-0	2-2 0-5	8-2 1-7	14-2 3-0	22	3 20-5	3 21-0	3 11-4	2-2 0-5	8-2 1-8	14-2 3-2
23	3 05-8	3 06-3	2 57-3	2-3 0-5	8-3 1-7	14-3 3-0	23	3 20-8	3 21-3	3 11-6	2-3 0-5	8-3 1-9	14-3 3-2
24	3 06-0	3 06-5	2 57-5	2-4 0-5	8-4 1-8	14-4 3-0	24	3 21-0	3 21-6	3 11-8	2-4 0-5	8-4 1-9	14-4 3-2
25	3 06-3	3 06-8	2 57-8	2-5 0-5	8-5 1-8	14-5 3-0	25	3 21-3	3 21-8	3 12-1	2-5 0-6	8-5 1-9	14-5 3-3
26	3 06-5	3 07-0	2 58-0	2-6 0-5	8-6 1-8	14-6 3-0	26	3 21-5	3 22-1	3 12-3	2-6 0-6	8-6 1-9	14-6 3-3
27	3 06-8	3 07-3	2 58-2	2-7 0-6	8-7 1-8	14-7 3-1	27	3 21-8	3 22-3	3 12-6	2-7 0-6	8-7 2-0	14-7 3-3
28	3 07-0	3 07-5	2 58-5	2-8 0-6	8-8 1-8	14-8 3-1	28	3 22-0	3 22-6	3 12-8	2-8 0-6	8-8 2-0	14-8 3-3
29	3 07-3	3 07-8	2 58-7	2-9 0-6	8-9 1-9	14-9 3-1	29	3 22-3	3 22-8	3 13-0	2-9 0-7	8-9 2-0	14-9 3-4
30	3 07-5	3 08-0	2 59-0	3-0 0-6	9-0 1-9	15-0 3-1	30	3 22-5	3 23-1	3 13-3	3-0 0-7	9-0 2-0	15-0 3-4
31	3 07-8	3 08-3	2 59-2	3-1 0-6	9-1 1-9	15-1 3-1	31	3 22-8	3 23-3	3 13-5	3-1 0-7	9-1 2-0	15-1 3-4
32	3 08-0	3 08-5	2 59-4	3-2 0-7	9-2 1-9	15-2 3-2	32	3 23-0	3 23-6	3 13-8	3-2 0-7	9-2 2-1	15-2 3-4
33	3 08-3	3 08-8	2 59-7	3-3 0-7	9-3 1-9	15-3 3-2	33	3 23-3	3 23-8	3 14-0	3-3 0-7	9-3 2-1	15-3 3-4
34	3 08-5	3 09-0	2 59-9	3-4 0-7	9-4 2-0	15-4 3-2	34	3 23-5	3 24-1	3 14-2	3-4 0-8	9-4 2-1	15-4 3-5
35	3 08-8	3 09-3	3 00-2	3-5 0-7	9-5 2-0	15-5 3-2	35	3 23-8	3 24-3	3 14-5	3-5 0-8	9-5 2-1	15-5 3-5
36	3 09-0	3 09-5	3 00-4	3-6 0-8	9-6 2-0	15-6 3-3	36	3 24-0	3 24-6	3 14-7	3-6 0-8	9-6 2-2	15-6 3-5
37	3 09-3	3 09-8	3 00-6	3-7 0-8	9-7 2-0	15-7 3-3	37	3 24-3	3 24-8	3 14-9	3-7 0-8	9-7 2-2	15-7 3-5
38	3 09-5	3 10-0	3 00-9	3-8 0-8	9-8 2-0	15-8 3-3	38	3 24-5	3 25-1	3 15-2	3-8 0-9	9-8 2-2	15-8 3-6
39	3 09-8	3 10-3	3 01-1	3-9 0-8	9-9 2-1	15-9 3-3	39	3 24-8	3 25-3	3 15-4	3-9 0-9	9-9 2-2	15-9 3-6
40	3 10-0	3 10-5	3 01-3	4-0 0-8	10-0 2-1	16-0 3-3	40	3 25-0	3 25-6	3 15-7	4-0 0-9	10-0 2-3	16-0 3-6
41	3 10-3	3 10-8	3 01-6	4-1 0-9	10-1 2-1	16-1 3-4	41	3 25-3	3 25-8	3 15-9	4-1 0-9	10-1 2-3	16-1 3-6
42	3 10-5	3 11-0	3 01-8	4-2 0-9	10-2 2-1	16-2 3-4	42	3 25-5	3 26-1	3 16-1	4-2 0-9	10-2 2-3	16-2 3-6
43	3 10-8	3 11-3	3 02-1	4-3 0-9	10-3 2-1	16-3 3-4	43	3 25-8	3 26-3	3 16-4	4-3 1-0	10-3 2-3	16-3 3-7
44	3 11-0	3 11-5	3 02-3	4-4 0-9	10-4 2-2	16-4 3-4	44	3 26-0	3 26-6	3 16-6	4-4 1-0	10-4 2-3	16-4 3-7
45	3 11-3	3 11-8	3 02-5	4-5 0-9	10-5 2-2	16-5 3-4	45	3 26-3	3 26-8	3 16-9	4-5 1-0	10-5 2-4	16-5 3-7
46	3 11-5	3 12-0	3 02-8	4-6 1-0	10-6 2-2	16-6 3-5	46	3 26-5	3 27-1	3 17-1	4-6 1-0	10-6 2-4	16-6 3-7
47	3 11-8	3 12-3	3 03-0	4-7 1-0	10-7 2-2	16-7 3-5	47	3 26-8	3 27-3	3 17-3	4-7 1-1	10-7 2-4	16-7 3-8
48	3 12-0	3 12-5	3 03-3	4-8 1-0	10-8 2-3	16-8 3-5	48	3 27-0	3 27-6	3 17-6	4-8 1-1	10-8 2-4	16-8 3-8
49	3 12-3	3 12-8	3 03-5	4-9 1-0	10-9 2-3	16-9 3-5	49	3 27-3	3 27-8	3 17-8	4-9 1-1	10-9 2-5	16-9 3-8
50	3 12-5	3 13-0	3 03-7	5-0 1-0	11-0 2-3	17-0 3-5	50	3 27-5	3 28-1	3 18-0	5-0 1-1	11-0 2-5	17-0 3-8
51	3 12-8	3 13-3	3 04-0	5-1 1-1	11-1 2-3	17-1 3-6	51	3 27-8	3 28-3	3 18-3	5-1 1-1	11-1 2-5	17-1 3-8
52	3 13-0	3 13-5	3 04-2	5-2 1-1	11-2 2-3	17-2 3-6	52	3 28-0	3 28-6	3 18-5	5-2 1-2	11-2 2-5	17-2 3-9
53	3 13-3	3 13-8	3 04-4	5-3 1-1	11-3 2-4	17-3 3-6	53	3 28-3	3 28-8	3 18-8	5-3 1-2	11-3 2-5	17-3 3-9
54	3 13-5	3 14-0	3 04-7	5-4 1-1	11-4 2-4	17-4 3-6	54	3 28-5	3 29-1	3 19-0	5-4 1-2	11-4 2-6	17-4 3-9
55	3 13-8	3 14-3	3 04-9	5-5 1-1	11-5 2-4	17-5 3-6	55	3 28-8	3 29-3	3 19-2	5-5 1-2	11-5 2-6	17-5 3-9
56	3 14-0	3 14-5	3 05-2	5-6 1-2	11-6 2-4	17-6 3-7	56	3 29-0	3 29-6	3 19-5	5-6 1-3	11-6 2-6	17-6 4-0
57	3 14-3	3 14-8	3 05-4	5-7 1-2	11-7 2-4	17-7 3-7	57	3 29-3	3 29-8	3 19-7	5-7 1-3	11-7 2-6	17-7 4-0
58	3 14-5	3 15-0	3 05-6	5-8 1-2	11-8 2-5	17-8 3-7	58	3 29-5	3 30-1	3 20-0	5-8 1-3	11-8 2-7	17-8 4-0
59	3 14-8	3 15-3	3 05-9	5-9 1-2	11-9 2-5	17-9 3-7	59	3 29-8	3 30-3	3 20-2	5-9 1-3	11-9 2-7	17-9 4-0
60	3 15-0	3 15-5	3 06-1	6-0 1-3	12-0 2-5	18-0 3-8	60	3 30-0	3 30-6	3 20-4	6-0 1-4	12-0 2-7	18-0 4-1

^m 14	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	3 30.0	3 30.6	3 20.4	0.0 0.0	6.0 1.5	12.0 2.9
01	3 30.3	3 30.8	3 20.7	0.1 0.0	6.1 1.5	12.1 2.9
02	3 30.5	3 31.1	3 20.9	0.2 0.0	6.2 1.5	12.2 2.9
03	3 30.8	3 31.3	3 21.1	0.3 0.1	6.3 1.5	12.3 3.0
04	3 31.0	3 31.6	3 21.4	0.4 0.1	6.4 1.5	12.4 3.0
05	3 31.3	3 31.8	3 21.6	0.5 0.1	6.5 1.6	12.5 3.0
06	3 31.5	3 32.1	3 21.9	0.6 0.1	6.6 1.6	12.6 3.0
07	3 31.8	3 32.3	3 22.1	0.7 0.2	6.7 1.6	12.7 3.1
08	3 32.0	3 32.6	3 22.3	0.8 0.2	6.8 1.6	12.8 3.1
09	3 32.3	3 32.8	3 22.6	0.9 0.2	6.9 1.7	12.9 3.1
10	3 32.5	3 33.1	3 22.8	1.0 0.2	7.0 1.7	13.0 3.1
11	3 32.8	3 33.3	3 23.1	1.1 0.3	7.1 1.7	13.1 3.2
12	3 33.0	3 33.6	3 23.3	1.2 0.3	7.2 1.7	13.2 3.2
13	3 33.3	3 33.8	3 23.5	1.3 0.3	7.3 1.8	13.3 3.2
14	3 33.5	3 34.1	3 23.8	1.4 0.3	7.4 1.8	13.4 3.2
15	3 33.8	3 34.3	3 24.0	1.5 0.4	7.5 1.8	13.5 3.3
16	3 34.0	3 34.6	3 24.3	1.6 0.4	7.6 1.8	13.6 3.3
17	3 34.3	3 34.8	3 24.5	1.7 0.4	7.7 1.9	13.7 3.3
18	3 34.5	3 35.1	3 24.7	1.8 0.4	7.8 1.9	13.8 3.3
19	3 34.8	3 35.3	3 25.0	1.9 0.5	7.9 1.9	13.9 3.4
20	3 35.0	3 35.6	3 25.2	2.0 0.5	8.0 1.9	14.0 3.4
21	3 35.3	3 35.8	3 25.4	2.1 0.5	8.1 2.0	14.1 3.4
22	3 35.5	3 36.1	3 25.7	2.2 0.5	8.2 2.0	14.2 3.4
23	3 35.8	3 36.3	3 25.9	2.3 0.6	8.3 2.0	14.3 3.5
24	3 36.0	3 36.6	3 26.2	2.4 0.6	8.4 2.0	14.4 3.5
25	3 36.3	3 36.8	3 26.4	2.5 0.6	8.5 2.1	14.5 3.5
26	3 36.5	3 37.1	3 26.6	2.6 0.6	8.6 2.1	14.6 3.5
27	3 36.8	3 37.3	3 26.9	2.7 0.7	8.7 2.1	14.7 3.6
28	3 37.0	3 37.6	3 27.1	2.8 0.7	8.8 2.1	14.8 3.6
29	3 37.3	3 37.8	3 27.4	2.9 0.7	8.9 2.2	14.9 3.6
30	3 37.5	3 38.1	3 27.6	3.0 0.7	9.0 2.2	15.0 3.6
31	3 37.8	3 38.3	3 27.8	3.1 0.7	9.1 2.2	15.1 3.6
32	3 38.0	3 38.6	3 28.1	3.2 0.8	9.2 2.2	15.2 3.7
33	3 38.3	3 38.8	3 28.3	3.3 0.8	9.3 2.2	15.3 3.7
34	3 38.5	3 39.1	3 28.5	3.4 0.8	9.4 2.3	15.4 3.7
35	3 38.8	3 39.3	3 28.8	3.5 0.8	9.5 2.3	15.5 3.7
36	3 39.0	3 39.6	3 29.0	3.6 0.9	9.6 2.3	15.6 3.8
37	3 39.3	3 39.9	3 29.3	3.7 0.9	9.7 2.3	15.7 3.8
38	3 39.5	3 40.1	3 29.5	3.8 0.9	9.8 2.4	15.8 3.8
39	3 39.8	3 40.4	3 29.7	3.9 0.9	9.9 2.4	15.9 3.8
40	3 40.0	3 40.6	3 30.0	4.0 1.0	10.0 2.4	16.0 3.9
41	3 40.3	3 40.9	3 30.2	4.1 1.0	10.1 2.4	16.1 3.9
42	3 40.5	3 41.1	3 30.5	4.2 1.0	10.2 2.5	16.2 3.9
43	3 40.8	3 41.4	3 30.7	4.3 1.0	10.3 2.5	16.3 3.9
44	3 41.0	3 41.6	3 30.9	4.4 1.1	10.4 2.5	16.4 4.0
45	3 41.3	3 41.9	3 31.2	4.5 1.1	10.5 2.5	16.5 4.0
46	3 41.5	3 42.1	3 31.4	4.6 1.1	10.6 2.6	16.6 4.0
47	3 41.8	3 42.4	3 31.6	4.7 1.1	10.7 2.6	16.7 4.0
48	3 42.0	3 42.6	3 31.9	4.8 1.2	10.8 2.6	16.8 4.1
49	3 42.3	3 42.9	3 32.1	4.9 1.2	10.9 2.6	16.9 4.1
50	3 42.5	3 43.1	3 32.4	5.0 1.2	11.0 2.7	17.0 4.1
51	3 42.8	3 43.4	3 32.6	5.1 1.2	11.1 2.7	17.1 4.1
52	3 43.0	3 43.6	3 32.8	5.2 1.3	11.2 2.7	17.2 4.2
53	3 43.3	3 43.9	3 33.1	5.3 1.3	11.3 2.7	17.3 4.2
54	3 43.5	3 44.1	3 33.3	5.4 1.3	11.4 2.8	17.4 4.2
55	3 43.8	3 44.4	3 33.6	5.5 1.3	11.5 2.8	17.5 4.2
56	3 44.0	3 44.6	3 33.8	5.6 1.4	11.6 2.8	17.6 4.3
57	3 44.3	3 44.9	3 34.0	5.7 1.4	11.7 2.8	17.7 4.3
58	3 44.5	3 45.1	3 34.3	5.8 1.4	11.8 2.9	17.8 4.3
59	3 44.8	3 45.4	3 34.5	5.9 1.4	11.9 2.9	17.9 4.3
60	3 45.0	3 45.6	3 34.8	6.0 1.5	12.0 2.9	18.0 4.4

^m 15	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	3 45.0	3 45.6	3 34.8	0.0 0.0	6.0 1.6	12.0 3.1
01	3 45.3	3 45.9	3 35.0	0.1 0.0	6.1 1.6	12.1 3.1
02	3 45.5	3 46.1	3 35.2	0.2 0.1	6.2 1.6	12.2 3.2
03	3 45.8	3 46.4	3 35.5	0.3 0.1	6.3 1.6	12.3 3.2
04	3 46.0	3 46.6	3 35.7	0.4 0.1	6.4 1.7	12.4 3.2
05	3 46.3	3 46.9	3 35.9	0.5 0.1	6.5 1.7	12.5 3.2
06	3 46.5	3 47.1	3 36.2	0.6 0.2	6.6 1.7	12.6 3.3
07	3 46.8	3 47.4	3 36.4	0.7 0.2	6.7 1.7	12.7 3.3
08	3 47.0	3 47.6	3 36.7	0.8 0.2	6.8 1.8	12.8 3.3
09	3 47.3	3 47.9	3 36.9	0.9 0.2	6.9 1.8	12.9 3.3
10	3 47.5	3 48.1	3 37.1	1.0 0.3	7.0 1.8	13.0 3.4
11	3 47.8	3 48.4	3 37.4	1.1 0.3	7.1 1.8	13.1 3.4
12	3 48.0	3 48.6	3 37.6	1.2 0.3	7.2 1.9	13.2 3.4
13	3 48.3	3 48.9	3 37.9	1.3 0.3	7.3 1.9	13.3 3.4
14	3 48.5	3 49.1	3 38.1	1.4 0.4	7.4 1.9	13.4 3.5
15	3 48.8	3 49.4	3 38.3	1.5 0.4	7.5 1.9	13.5 3.5
16	3 49.0	3 49.6	3 38.6	1.6 0.4	7.6 2.0	13.6 3.5
17	3 49.3	3 49.9	3 38.8	1.7 0.4	7.7 2.0	13.7 3.5
18	3 49.5	3 50.1	3 39.0	1.8 0.5	7.8 2.0	13.8 3.6
19	3 49.8	3 50.4	3 39.3	1.9 0.5	7.9 2.0	13.9 3.6
20	3 50.0	3 50.6	3 39.5	2.0 0.5	8.0 2.1	14.0 3.6
21	3 50.3	3 50.9	3 39.8	2.1 0.5	8.1 2.1	14.1 3.6
22	3 50.5	3 51.1	3 40.0	2.2 0.6	8.2 2.1	14.2 3.7
23	3 50.8	3 51.4	3 40.2	2.3 0.6	8.3 2.1	14.3 3.7
24	3 51.0	3 51.6	3 40.5	2.4 0.6	8.4 2.2	14.4 3.7
25	3 51.3	3 51.9	3 40.7	2.5 0.6	8.5 2.2	14.5 3.7
26	3 51.5	3 52.1	3 41.0	2.6 0.7	8.6 2.2	14.6 3.8
27	3 51.8	3 52.4	3 41.2	2.7 0.7	8.7 2.2	14.7 3.8
28	3 52.0	3 52.6	3 41.4	2.8 0.7	8.8 2.3	14.8 3.8
29	3 52.3	3 52.9	3 41.7	2.9 0.7	8.9 2.3	14.9 3.8
30	3 52.5	3 53.1	3 41.9	3.0 0.8	9.0 2.3	15.0 3.9
31	3 52.8	3 53.4	3 42.1	3.1 0.8	9.1 2.4	15.1 3.9
32	3 53.0	3 53.6	3 42.4	3.2 0.8	9.2 2.4	15.2 3.9
33	3 53.3	3 53.9	3 42.6	3.3 0.9	9.3 2.4	15.3 4.0
34	3 53.5	3 54.1	3 42.9	3.4 0.9	9.4 2.4	15.4 4.0
35	3 53.8	3 54.4	3 43.1	3.5 0.9	9.5 2.5	15.5 4.0
36	3 54.0	3 54.6	3 43.3	3.6 0.9	9.6 2.5	15.6 4.0
37	3 54.3	3 54.9	3 43.6	3.7 1.0	9.7 2.5	15.7 4.1
38	3 54.5	3 55.1	3 43.8	3.8 1.0	9.8 2.5	15.8 4.1
39	3 54.8	3 55.4	3 44.1	3.9 1.0	9.9 2.6	15.9 4.1
40	3 55.0	3 55.6	3 44.3	4.0 1.0	10.0 2.6	16.0 4.1
41	3 55.3	3 55.9	3 44.5	4.1 1.1	10.1 2.6	16.1 4.2
42	3 55.5	3 56.1	3 44.8	4.2 1.1	10.2 2.6	16.2 4.2
43	3 55.8	3 56.4	3 45.0	4.3 1.1	10.3 2.7	16.3 4.2
44	3 56.0	3 56.6	3 45.2	4.4 1.1	10.4 2.7	16.4 4.2
45	3 56.3	3 56.9	3 45.5	4.5 1.2	10.5 2.7	16.5 4.3
46	3 56.5	3 57.1	3 45.7	4.6 1.2	10.6 2.7	16.6 4.3
47	3 56.8	3 57.4	3 46.0	4.7 1.2	10.7 2.8	16.7 4.3
48	3 57.0	3 57.6	3 46.2	4.8 1.2	10.8 2.8	16.8 4.3
49	3 57.3	3 57.9	3 46.4	4.9 1.3	10.9 2.8	16.9 4.4
50	3 57.5	3 58.2	3 46.7	5.0 1.3	11.0 2.8	17.0 4.4
51	3 57.8	3 58.4	3 46.9	5.1 1.3	11.1 2.9	17.1 4.4
52	3 58.0	3 58.7	3 47.2	5.2 1.3	11.2 2.9	17.2 4.4
53	3 58.3	3 58.9	3 47.4	5.3 1.4	11.3 2.9	17.3 4.5
54	3 58.5	3 59.2	3 47.6	5.4 1.4	11.4 2.9	17.4 4.5
55	3 58.8	3 59.4	3 47.9	5.5 1.4	11.5 3.0	17.5 4.5
56	3 59.0	3 59.7	3 48.1	5.6 1.4	11.6 3.0	17.6 4.5
57	3 59.3	3 59.9	3 48.4	5.7 1.5	11.7 3.0	17.7 4.6
58	3 59.5	4 00.2	3 48.6	5.8 1.5	11.8 3.0	17.8 4.6
59	3 59.8	4 00.4	3 48.8	5.9 1.5	11.9 3.1	17.9 4.6
60	4 00.0	4 00.7	3 49.1	6.0 1.6	12.0 3.1	18.0 4.7

^m 16	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	4 00-0	4 00-7	3 49-1	0-0 0-0	6-0 1-7	12-0 3-3
01	4 00-3	4 00-9	3 49-3	0-1 0-0	6-1 1-7	12-1 3-3
02	4 00-5	4 01-2	3 49-5	0-2 0-1	6-2 1-7	12-2 3-4
03	4 00-8	4 01-4	3 49-8	0-3 0-1	6-3 1-7	12-3 3-4
04	4 01-0	4 01-7	3 50-0	0-4 0-1	6-4 1-8	12-4 3-4
05	4 01-3	4 01-9	3 50-3	0-5 0-1	6-5 1-8	12-5 3-4
06	4 01-5	4 02-2	3 50-5	0-6 0-2	6-6 1-8	12-6 3-5
07	4 01-8	4 02-4	3 50-7	0-7 0-2	6-7 1-8	12-7 3-5
08	4 02-0	4 02-7	3 51-0	0-8 0-2	6-8 1-9	12-8 3-5
09	4 02-3	4 02-9	3 51-2	0-9 0-2	6-9 1-9	12-9 3-5
10	4 02-5	4 03-2	3 51-5	1-0 0-3	7-0 1-9	13-0 3-6
11	4 02-8	4 03-4	3 51-7	1-1 0-3	7-1 2-0	13-1 3-6
12	4 03-0	4 03-7	3 51-9	1-2 0-3	7-2 2-0	13-2 3-6
13	4 03-3	4 03-9	3 52-2	1-3 0-4	7-3 2-0	13-3 3-7
14	4 03-5	4 04-2	3 52-4	1-4 0-4	7-4 2-0	13-4 3-7
15	4 03-8	4 04-4	3 52-6	1-5 0-4	7-5 2-1	13-5 3-7
16	4 04-0	4 04-7	3 52-9	1-6 0-4	7-6 2-1	13-6 3-7
17	4 04-3	4 04-9	3 53-1	1-7 0-5	7-7 2-1	13-7 3-8
18	4 04-5	4 05-2	3 53-4	1-8 0-5	7-8 2-1	13-8 3-8
19	4 04-8	4 05-4	3 53-6	1-9 0-5	7-9 2-2	13-9 3-8
20	4 05-0	4 05-7	3 53-8	2-0 0-6	8-0 2-2	14-0 3-9
21	4 05-3	4 05-9	3 54-1	2-1 0-6	8-1 2-2	14-1 3-9
22	4 05-5	4 06-2	3 54-3	2-2 0-6	8-2 2-3	14-2 3-9
23	4 05-8	4 06-4	3 54-6	2-3 0-6	8-3 2-3	14-3 3-9
24	4 06-0	4 06-7	3 54-8	2-4 0-7	8-4 2-3	14-4 4-0
25	4 06-3	4 06-9	3 55-0	2-5 0-7	8-5 2-3	14-5 4-0
26	4 06-5	4 07-2	3 55-3	2-6 0-7	8-6 2-4	14-6 4-0
27	4 06-8	4 07-4	3 55-5	2-7 0-7	8-7 2-4	14-7 4-0
28	4 07-0	4 07-7	3 55-7	2-8 0-8	8-8 2-4	14-8 4-1
29	4 07-3	4 07-9	3 56-0	2-9 0-8	8-9 2-4	14-9 4-1
30	4 07-5	4 08-2	3 56-2	3-0 0-8	9-0 2-5	15-0 4-1
31	4 07-8	4 08-4	3 56-5	3-1 0-9	9-1 2-5	15-1 4-2
32	4 08-0	4 08-7	3 56-7	3-2 0-9	9-2 2-5	15-2 4-2
33	4 08-3	4 08-9	3 56-9	3-3 0-9	9-3 2-6	15-3 4-2
34	4 08-5	4 09-2	3 57-2	3-4 0-9	9-4 2-6	15-4 4-2
35	4 08-8	4 09-4	3 57-4	3-5 1-0	9-5 2-6	15-5 4-3
36	4 09-0	4 09-7	3 57-7	3-6 1-0	9-6 2-6	15-6 4-3
37	4 09-3	4 09-9	3 57-9	3-7 1-0	9-7 2-7	15-7 4-3
38	4 09-5	4 10-2	3 58-1	3-8 1-0	9-8 2-7	15-8 4-3
39	4 09-8	4 10-4	3 58-4	3-9 1-1	9-9 2-7	15-9 4-4
40	4 10-0	4 10-7	3 58-6	4-0 1-1	10-0 2-8	16-0 4-4
41	4 10-3	4 10-9	3 58-8	4-1 1-1	10-1 2-8	16-1 4-4
42	4 10-5	4 11-2	3 59-1	4-2 1-2	10-2 2-8	16-2 4-5
43	4 10-8	4 11-4	3 59-3	4-3 1-2	10-3 2-8	16-3 4-5
44	4 11-0	4 11-7	3 59-6	4-4 1-2	10-4 2-9	16-4 4-5
45	4 11-3	4 11-9	3 59-8	4-5 1-2	10-5 2-9	16-5 4-5
46	4 11-5	4 12-2	4 00-0	4-6 1-3	10-6 2-9	16-6 4-6
47	4 11-8	4 12-4	4 00-3	4-7 1-3	10-7 2-9	16-7 4-6
48	4 12-0	4 12-7	4 00-5	4-8 1-3	10-8 3-0	16-8 4-6
49	4 12-3	4 12-9	4 00-8	4-9 1-3	10-9 3-0	16-9 4-6
50	4 12-5	4 13-2	4 01-0	5-0 1-4	11-0 3-0	17-0 4-7
51	4 12-8	4 13-4	4 01-2	5-1 1-4	11-1 3-1	17-1 4-7
52	4 13-0	4 13-7	4 01-5	5-2 1-4	11-2 3-1	17-2 4-7
53	4 13-3	4 13-9	4 01-7	5-3 1-5	11-3 3-1	17-3 4-8
54	4 13-5	4 14-2	4 02-0	5-4 1-5	11-4 3-1	17-4 4-8
55	4 13-8	4 14-4	4 02-2	5-5 1-5	11-5 3-2	17-5 4-8
56	4 14-0	4 14-7	4 02-4	5-6 1-5	11-6 3-2	17-6 4-8
57	4 14-3	4 14-9	4 02-7	5-7 1-6	11-7 3-2	17-7 4-9
58	4 14-5	4 15-2	4 02-9	5-8 1-6	11-8 3-2	17-8 4-9
59	4 14-8	4 15-4	4 03-1	5-9 1-6	11-9 3-3	17-9 4-9
60	4 15-0	4 15-7	4 03-4	6-0 1-7	12-0 3-3	18-0 5-0

^m 17	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	4 15-0	4 15-7	4 03-4	0-0 0-0	6-0 1-8	12-0 3-5
01	4 15-3	4 15-9	4 03-6	0-1 0-0	6-1 1-8	12-1 3-5
02	4 15-5	4 16-2	4 03-9	0-2 0-1	6-2 1-8	12-2 3-6
03	4 15-8	4 16-5	4 04-1	0-3 0-1	6-3 1-8	12-3 3-6
04	4 16-0	4 16-7	4 04-3	0-4 0-1	6-4 1-9	12-4 3-6
05	4 16-3	4 17-0	4 04-6	0-5 0-1	6-5 1-9	12-5 3-6
06	4 16-5	4 17-2	4 04-8	0-6 0-2	6-6 1-9	12-6 3-7
07	4 16-8	4 17-5	4 05-1	0-7 0-2	6-7 2-0	12-7 3-7
08	4 17-0	4 17-7	4 05-3	0-8 0-2	6-8 2-0	12-8 3-7
09	4 17-3	4 18-0	4 05-5	0-9 0-3	6-9 2-0	12-9 3-8
10	4 17-5	4 18-2	4 05-8	1-0 0-3	7-0 2-0	13-0 3-8
11	4 17-8	4 18-5	4 06-0	1-1 0-3	7-1 2-1	13-1 3-8
12	4 18-0	4 18-7	4 06-2	1-2 0-4	7-2 2-1	13-2 3-9
13	4 18-3	4 19-0	4 06-5	1-3 0-4	7-3 2-1	13-3 3-9
14	4 18-5	4 19-2	4 06-7	1-4 0-4	7-4 2-2	13-4 3-9
15	4 18-8	4 19-5	4 07-0	1-5 0-4	7-5 2-2	13-5 3-9
16	4 19-0	4 19-7	4 07-2	1-6 0-5	7-6 2-2	13-6 4-0
17	4 19-3	4 20-0	4 07-4	1-7 0-5	7-7 2-2	13-7 4-0
18	4 19-5	4 20-2	4 07-7	1-8 0-5	7-8 2-3	13-8 4-0
19	4 19-8	4 20-5	4 07-9	1-9 0-6	7-9 2-3	13-9 4-1
20	4 20-0	4 20-7	4 08-2	2-0 0-6	8-0 2-3	14-0 4-1
21	4 20-3	4 21-0	4 08-4	2-1 0-6	8-1 2-4	14-1 4-1
22	4 20-5	4 21-2	4 08-6	2-2 0-6	8-2 2-4	14-2 4-1
23	4 20-8	4 21-5	4 08-9	2-3 0-7	8-3 2-4	14-3 4-2
24	4 21-0	4 21-7	4 09-1	2-4 0-7	8-4 2-5	14-4 4-2
25	4 21-3	4 22-0	4 09-3	2-5 0-7	8-5 2-5	14-5 4-2
26	4 21-5	4 22-2	4 09-6	2-6 0-8	8-6 2-5	14-6 4-3
27	4 21-8	4 22-5	4 09-8	2-7 0-8	8-7 2-5	14-7 4-3
28	4 22-0	4 22-7	4 10-1	2-8 0-8	8-8 2-6	14-8 4-3
29	4 22-3	4 23-0	4 10-3	2-9 0-8	8-9 2-6	14-9 4-4
30	4 22-5	4 23-2	4 10-5	3-0 0-9	9-0 2-6	15-0 4-4
31	4 22-8	4 23-5	4 10-8	3-1 0-9	9-1 2-7	15-1 4-4
32	4 23-0	4 23-7	4 11-0	3-2 0-9	9-2 2-7	15-2 4-4
33	4 23-3	4 24-0	4 11-3	3-3 1-0	9-3 2-7	15-3 4-5
34	4 23-5	4 24-2	4 11-5	3-4 1-0	9-4 2-7	15-4 4-5
35	4 23-8	4 24-5	4 11-7	3-5 1-0	9-5 2-8	15-5 4-5
36	4 24-0	4 24-7	4 12-0	3-6 1-1	9-6 2-8	15-6 4-6
37	4 24-3	4 25-0	4 12-2	3-7 1-1	9-7 2-8	15-7 4-6
38	4 24-5	4 25-2	4 12-5	3-8 1-1	9-8 2-9	15-8 4-6
39	4 24-8	4 25-5	4 12-7	3-9 1-1	9-9 2-9	15-9 4-6
40	4 25-0	4 25-7	4 12-9	4-0 1-2	10-0 2-9	16-0 4-7
41	4 25-3	4 26-0	4 13-2	4-1 1-2	10-1 2-9	16-1 4-7
42	4 25-5	4 26-2	4 13-4	4-2 1-2	10-2 3-0	16-2 4-7
43	4 25-8	4 26-5	4 13-6	4-3 1-3	10-3 3-0	16-3 4-8
44	4 26-0	4 26-7	4 13-9	4-4 1-3	10-4 3-0	16-4 4-8
45	4 26-3	4 27-0	4 14-1	4-5 1-3	10-5 3-1	16-5 4-8
46	4 26-5	4 27-2	4 14-4	4-6 1-3	10-6 3-1	16-6 4-8
47	4 26-8	4 27-5	4 14-6	4-7 1-4	10-7 3-1	16-7 4-9
48	4 27-0	4 27-7	4 14-8	4-8 1-4	10-8 3-2	16-8 4-9
49	4 27-3	4 28-0	4 15-1	4-9 1-4	10-9 3-2	16-9 4-9
50	4 27-5	4 28-2	4 15-3	5-0 1-5	11-0 3-2	17-0 5-0
51	4 27-8	4 28-5	4 15-6	5-1 1-5	11-1 3-2	17-1 5-0
52	4 28-0	4 28-7	4 15-8	5-2 1-5	11-2 3-3	17-2 5-0
53	4 28-3	4 29-0	4 16-0	5-3 1-5	11-3 3-3	17-3 5-0
54	4 28-5	4 29-2	4 16-3	5-4 1-6	11-4 3-3	17-4 5-1
55	4 28-8	4 29-5	4 16-5	5-5 1-6	11-5 3-4	17-5 5-1
56	4 29-0	4 29-7	4 16-7	5-6 1-6	11-6 3-4	17-6 5-1
57	4 29-3	4 30-0	4 17-0	5-7 1-7	11-7 3-4	17-7 5-2
58	4 29-5	4 30-2	4 17-2	5-8 1-7	11-8 3-4	17-8 5-2
59	4 29-8	4 30-5	4 17-5	5-9 1-7	11-9 3-5	17-9 5-2
60	4 30-0	4 30-7	4 17-7	6-0 1-8	12-0 3-5	18-0 5-3

^m 18	SUN PLANETS	ARIES	MOON	^v or <i>d</i>	Corr ⁿ	^v or <i>d</i>	Corr ⁿ	^v or <i>d</i>	Corr ⁿ
^s	^o ⁱ	^o ⁱ	^o ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ
00	4 30.0	4 30.7	4 17.7	0.0	0.0	6.0	1.9	12.0	3.7
01	4 30.3	4 31.0	4 17.9	0.1	0.0	6.1	1.9	12.1	3.7
02	4 30.5	4 31.2	4 18.2	0.2	0.1	6.2	1.9	12.2	3.8
03	4 30.8	4 31.5	4 18.4	0.3	0.1	6.3	1.9	12.3	3.8
04	4 31.0	4 31.7	4 18.7	0.4	0.1	6.4	2.0	12.4	3.8
05	4 31.3	4 32.0	4 18.9	0.5	0.2	6.5	2.0	12.5	3.9
06	4 31.5	4 32.2	4 19.1	0.6	0.2	6.6	2.0	12.6	3.9
07	4 31.8	4 32.5	4 19.4	0.7	0.2	6.7	2.1	12.7	3.9
08	4 32.0	4 32.7	4 19.6	0.8	0.2	6.8	2.1	12.8	3.9
09	4 32.3	4 33.0	4 19.8	0.9	0.3	6.9	2.1	12.9	4.0
10	4 32.5	4 33.2	4 20.1	1.0	0.3	7.0	2.2	13.0	4.0
11	4 32.8	4 33.5	4 20.3	1.1	0.3	7.1	2.2	13.1	4.0
12	4 33.0	4 33.7	4 20.6	1.2	0.4	7.2	2.2	13.2	4.1
13	4 33.3	4 34.0	4 20.8	1.3	0.4	7.3	2.3	13.3	4.1
14	4 33.5	4 34.2	4 21.0	1.4	0.4	7.4	2.3	13.4	4.1
15	4 33.8	4 34.5	4 21.3	1.5	0.5	7.5	2.3	13.5	4.2
16	4 34.0	4 34.8	4 21.5	1.6	0.5	7.6	2.3	13.6	4.2
17	4 34.3	4 35.0	4 21.8	1.7	0.5	7.7	2.4	13.7	4.2
18	4 34.5	4 35.3	4 22.0	1.8	0.6	7.8	2.4	13.8	4.3
19	4 34.8	4 35.5	4 22.2	1.9	0.6	7.9	2.4	13.9	4.3
20	4 35.0	4 35.8	4 22.5	2.0	0.6	8.0	2.5	14.0	4.3
21	4 35.3	4 36.0	4 22.7	2.1	0.6	8.1	2.5	14.1	4.3
22	4 35.5	4 36.3	4 22.9	2.2	0.7	8.2	2.5	14.2	4.4
23	4 35.8	4 36.5	4 23.2	2.3	0.7	8.3	2.6	14.3	4.4
24	4 36.0	4 36.8	4 23.4	2.4	0.7	8.4	2.6	14.4	4.4
25	4 36.3	4 37.0	4 23.7	2.5	0.8	8.5	2.6	14.5	4.5
26	4 36.5	4 37.3	4 23.9	2.6	0.8	8.6	2.7	14.6	4.5
27	4 36.8	4 37.5	4 24.1	2.7	0.8	8.7	2.7	14.7	4.5
28	4 37.0	4 37.8	4 24.4	2.8	0.9	8.8	2.7	14.8	4.6
29	4 37.3	4 38.0	4 24.6	2.9	0.9	8.9	2.7	14.9	4.6
30	4 37.5	4 38.3	4 24.9	3.0	0.9	9.0	2.8	15.0	4.6
31	4 37.8	4 38.5	4 25.1	3.1	1.0	9.1	2.8	15.1	4.7
32	4 38.0	4 38.8	4 25.3	3.2	1.0	9.2	2.8	15.2	4.7
33	4 38.3	4 39.0	4 25.6	3.3	1.0	9.3	2.9	15.3	4.7
34	4 38.5	4 39.3	4 25.8	3.4	1.0	9.4	2.9	15.4	4.7
35	4 38.8	4 39.5	4 26.1	3.5	1.1	9.5	2.9	15.5	4.8
36	4 39.0	4 39.8	4 26.3	3.6	1.1	9.6	3.0	15.6	4.8
37	4 39.3	4 40.0	4 26.5	3.7	1.1	9.7	3.0	15.7	4.8
38	4 39.5	4 40.3	4 26.8	3.8	1.2	9.8	3.0	15.8	4.9
39	4 39.8	4 40.5	4 27.0	3.9	1.2	9.9	3.1	15.9	4.9
40	4 40.0	4 40.8	4 27.2	4.0	1.2	10.0	3.1	16.0	4.9
41	4 40.3	4 41.0	4 27.5	4.1	1.3	10.1	3.1	16.1	5.0
42	4 40.5	4 41.3	4 27.7	4.2	1.3	10.2	3.1	16.2	5.0
43	4 40.8	4 41.5	4 28.0	4.3	1.3	10.3	3.2	16.3	5.0
44	4 41.0	4 41.8	4 28.2	4.4	1.4	10.4	3.2	16.4	5.1
45	4 41.3	4 42.0	4 28.4	4.5	1.4	10.5	3.2	16.5	5.1
46	4 41.5	4 42.3	4 28.7	4.6	1.4	10.6	3.3	16.6	5.1
47	4 41.8	4 42.5	4 28.9	4.7	1.4	10.7	3.3	16.7	5.1
48	4 42.0	4 42.8	4 29.2	4.8	1.5	10.8	3.3	16.8	5.2
49	4 42.3	4 43.0	4 29.4	4.9	1.5	10.9	3.4	16.9	5.2
50	4 42.5	4 43.3	4 29.6	5.0	1.5	11.0	3.4	17.0	5.2
51	4 42.8	4 43.5	4 29.9	5.1	1.6	11.1	3.4	17.1	5.3
52	4 43.0	4 43.8	4 30.1	5.2	1.6	11.2	3.5	17.2	5.3
53	4 43.3	4 44.0	4 30.3	5.3	1.6	11.3	3.5	17.3	5.3
54	4 43.5	4 44.3	4 30.6	5.4	1.7	11.4	3.5	17.4	5.4
55	4 43.8	4 44.5	4 30.8	5.5	1.7	11.5	3.5	17.5	5.4
56	4 44.0	4 44.8	4 31.1	5.6	1.7	11.6	3.6	17.6	5.4
57	4 44.3	4 45.0	4 31.3	5.7	1.8	11.7	3.6	17.7	5.5
58	4 44.5	4 45.3	4 31.5	5.8	1.8	11.8	3.6	17.8	5.5
59	4 44.8	4 45.5	4 31.8	5.9	1.8	11.9	3.7	17.9	5.5
60	4 45.0	4 45.8	4 32.0	6.0	1.9	12.0	3.7	18.0	5.6

^m 19	SUN PLANETS	ARIES	MOON	^v or <i>d</i>	Corr ⁿ	^v or <i>d</i>	Corr ⁿ	^v or <i>d</i>	Corr ⁿ
^s	^o ⁱ	^o ⁱ	^o ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ	ⁱ ⁱ
00	4 45.0	4 45.8	4 32.0	0.0	0.0	6.0	2.0	12.0	3.9
01	4 45.3	4 46.0	4 32.3	0.1	0.0	6.1	2.0	12.1	3.9
02	4 45.5	4 46.3	4 32.5	0.2	0.1	6.2	2.0	12.2	4.0
03	4 45.8	4 46.5	4 32.7	0.3	0.1	6.3	2.0	12.3	4.0
04	4 46.0	4 46.8	4 33.0	0.4	0.1	6.4	2.1	12.4	4.0
05	4 46.3	4 47.0	4 33.2	0.5	0.2	6.5	2.1	12.5	4.1
06	4 46.5	4 47.3	4 33.4	0.6	0.2	6.6	2.1	12.6	4.1
07	4 46.8	4 47.5	4 33.7	0.7	0.2	6.7	2.2	12.7	4.1
08	4 47.0	4 47.8	4 33.9	0.8	0.3	6.8	2.2	12.8	4.2
09	4 47.3	4 48.0	4 34.2	0.9	0.3	6.9	2.2	12.9	4.2
10	4 47.5	4 48.3	4 34.4	1.0	0.3	7.0	2.3	13.0	4.2
11	4 47.8	4 48.5	4 34.6	1.1	0.4	7.1	2.3	13.1	4.3
12	4 48.0	4 48.8	4 34.9	1.2	0.4	7.2	2.3	13.2	4.3
13	4 48.3	4 49.0	4 35.1	1.3	0.4	7.3	2.4	13.3	4.3
14	4 48.5	4 49.3	4 35.4	1.4	0.5	7.4	2.4	13.4	4.4
15	4 48.8	4 49.5	4 35.6	1.5	0.5	7.5	2.4	13.5	4.4
16	4 49.0	4 49.8	4 35.8	1.6	0.5	7.6	2.5	13.6	4.4
17	4 49.3	4 50.0	4 36.1	1.7	0.6	7.7	2.5	13.7	4.5
18	4 49.5	4 50.3	4 36.3	1.8	0.6	7.8	2.5	13.8	4.5
19	4 49.8	4 50.5	4 36.6	1.9	0.6	7.9	2.6	13.9	4.5
20	4 50.0	4 50.8	4 36.8	2.0	0.7	8.0	2.6	14.0	4.6
21	4 50.3	4 51.0	4 37.0	2.1	0.7	8.1	2.6	14.1	4.6
22	4 50.5	4 51.3	4 37.3	2.2	0.7	8.2	2.7	14.2	4.6
23	4 50.8	4 51.5	4 37.5	2.3	0.7	8.3	2.7	14.3	4.6
24	4 51.0	4 51.8	4 37.7	2.4	0.8	8.4	2.7	14.4	4.7
25	4 51.3	4 52.0	4 38.0	2.5	0.8	8.5	2.8	14.5	4.7
26	4 51.5	4 52.3	4 38.2	2.6	0.8	8.6	2.8	14.6	4.7
27	4 51.8	4 52.5	4 38.5	2.7	0.9	8.7	2.8	14.7	4.8
28	4 52.0	4 52.8	4 38.7	2.8	0.9	8.8	2.9	14.8	4.8
29	4 52.3	4 53.1	4 38.9	2.9	0.9	8.9	2.9	14.9	4.8
30	4 52.5	4 53.3	4 39.2	3.0	1.0	9.0	2.9	15.0	4.9
31	4 52.8	4 53.6	4 39.4	3.1	1.0	9.1	3.0	15.1	4.9
32	4 53.0	4 53.8	4 39.7	3.2	1.0	9.2	3.0	15.2	4.9
33	4 53.3	4 54.1	4 39.9	3.3	1.1	9.3	3.0	15.3	5.0
34	4 53.5	4 54.3	4 40.1	3.4	1.1	9.4	3.1	15.4	5.0
35	4 53.8	4 54.6	4 40.4	3.5	1.1	9.5	3.1	15.5	5.0
36	4 54.0	4 54.8	4 40.6	3.6	1.2	9.6	3.1	15.6	5.1
37	4 54.3	4 55.1	4 40.8	3.7	1.2	9.7	3.2	15.7	5.1
38	4 54.5	4 55.3	4 41.1	3.8	1.2	9.8	3.2	15.8	5.1
39	4 54.8	4 55.6	4 41.3	3.9	1.3	9.9	3.2	15.9	5.2
40	4 55.0	4 55.8	4 41.6	4.0	1.3	10.0	3.3	16.0	5.2
41	4 55.3	4 56.1	4 41.8	4.1	1.3	10.1	3.3	16.1	5.2
42	4 55.5	4 56.3	4 42.0	4.2	1.4	10.2	3.3	16.2	5.3
43	4 55.8	4 56.6	4 42.3	4.3	1.4	10.3	3.3	16.3	5.3
44	4 56.0	4 56.8	4 42.5	4.4	1.4	10.4	3.4	16.4	5.3
45	4 56.3	4 57.1	4 42.8	4.5	1.5	10.5	3.4	16.5	5.4
46	4 56.5	4 57.3	4 43.0	4.6	1.5	10.6	3.4	16.6	5.4
47	4 56.8	4 57.6	4 43.2	4.7	1.5	10.7	3.5	16.7	5.4
48	4 57.0	4 57.8	4 43.5	4.8	1.6	10.8	3.5	16.8	5.5
49	4 57.3	4 58.1	4 43.7	4.9	1.6	10.9	3.5	16.9	5.5
50	4 57.5	4 58.3	4 43.9	5.0	1.6	11.0	3.6	17.0	5.5
51	4 57.8	4 58.6	4 44.2	5.1	1.7	11.1	3.6	17.1	5.6
52	4 58.0	4 58.8	4 44.4	5.2	1.7	11.2	3.6	17.2	5.6
53	4 58.3	4 59.1	4 44.7	5.3	1.7	11.3	3.7	17.3	5.6
54	4 58.5	4 59.3	4 44.9	5.4	1.8	11.4	3.7	17.4	5.7
55	4 58.8	4 59.6	4 45.1	5.5	1.8	11.5	3.7	17.5	5.7
56	4 59.0	4 59.8	4 45.4	5.6	1.8	11.6	3.8	17.6	5.7
57	4 59.3	5 00.1	4 45.6	5.7	1.9	11.7	3.8	17.7	5.8
58	4 59.5	5 00.3	4 45.9	5.8	1.9	11.8	3.8	17.8	5.8
59	4 59.8	5 00.6	4 46.1	5.9	1.9	11.9	3.9	17.9	5.8
60	5 00.0	5 00.8	4 46.3	6.0	2.0	12.0	3.9	18.0	5.9

^m 20	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	^m 21	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /
00	5 00:0	5 00:8	4 46:3	0:0 0:0	6:0 2:1	12:0 4:1	00	5 15:0	5 15:9	5 00:7	0:0 0:0	6:0 2:2	12:0 4:3
01	5 00:3	5 01:1	4 46:6	0:1 0:0	6:1 2:1	12:1 4:1	01	5 15:3	5 16:1	5 00:9	0:1 0:0	6:1 2:2	12:1 4:3
02	5 00:5	5 01:3	4 46:8	0:2 0:1	6:2 2:1	12:2 4:2	02	5 15:5	5 16:4	5 01:1	0:2 0:1	6:2 2:2	12:2 4:4
03	5 00:8	5 01:6	4 47:0	0:3 0:1	6:3 2:2	12:3 4:2	03	5 15:8	5 16:6	5 01:4	0:3 0:1	6:3 2:3	12:3 4:4
04	5 01:0	5 01:8	4 47:3	0:4 0:1	6:4 2:2	12:4 4:2	04	5 16:0	5 16:9	5 01:6	0:4 0:1	6:4 2:3	12:4 4:4
05	5 01:3	5 02:1	4 47:5	0:5 0:2	6:5 2:2	12:5 4:3	05	5 16:3	5 17:1	5 01:8	0:5 0:2	6:5 2:3	12:5 4:5
06	5 01:5	5 02:3	4 47:8	0:6 0:2	6:6 2:3	12:6 4:3	06	5 16:5	5 17:4	5 02:1	0:6 0:2	6:6 2:4	12:6 4:5
07	5 01:8	5 02:6	4 48:0	0:7 0:2	6:7 2:3	12:7 4:3	07	5 16:8	5 17:6	5 02:3	0:7 0:3	6:7 2:4	12:7 4:6
08	5 02:0	5 02:8	4 48:2	0:8 0:3	6:8 2:3	12:8 4:4	08	5 17:0	5 17:9	5 02:6	0:8 0:3	6:8 2:4	12:8 4:6
09	5 02:3	5 03:1	4 48:5	0:9 0:3	6:9 2:4	12:9 4:4	09	5 17:3	5 18:1	5 02:8	0:9 0:3	6:9 2:5	12:9 4:6
10	5 02:5	5 03:3	4 48:7	1:0 0:3	7:0 2:4	13:0 4:4	10	5 17:5	5 18:4	5 03:0	1:0 0:4	7:0 2:5	13:0 4:7
11	5 02:8	5 03:6	4 49:0	1:1 0:4	7:1 2:4	13:1 4:5	11	5 17:8	5 18:6	5 03:3	1:1 0:4	7:1 2:5	13:1 4:7
12	5 03:0	5 03:8	4 49:2	1:2 0:4	7:2 2:5	13:2 4:5	12	5 18:0	5 18:9	5 03:5	1:2 0:4	7:2 2:6	13:2 4:7
13	5 03:3	5 04:1	4 49:4	1:3 0:4	7:3 2:5	13:3 4:5	13	5 18:3	5 19:1	5 03:8	1:3 0:5	7:3 2:6	13:3 4:8
14	5 03:5	5 04:3	4 49:7	1:4 0:5	7:4 2:5	13:4 4:6	14	5 18:5	5 19:4	5 04:0	1:4 0:5	7:4 2:7	13:4 4:8
15	5 03:8	5 04:6	4 49:9	1:5 0:5	7:5 2:6	13:5 4:6	15	5 18:8	5 19:6	5 04:2	1:5 0:5	7:5 2:7	13:5 4:8
16	5 04:0	5 04:8	4 50:2	1:6 0:5	7:6 2:6	13:6 4:6	16	5 19:0	5 19:9	5 04:5	1:6 0:6	7:6 2:7	13:6 4:9
17	5 04:3	5 05:1	4 50:4	1:7 0:6	7:7 2:6	13:7 4:7	17	5 19:3	5 20:1	5 04:7	1:7 0:6	7:7 2:8	13:7 4:9
18	5 04:5	5 05:3	4 50:6	1:8 0:6	7:8 2:7	13:8 4:7	18	5 19:5	5 20:4	5 04:9	1:8 0:6	7:8 2:8	13:8 4:9
19	5 04:8	5 05:6	4 50:9	1:9 0:6	7:9 2:7	13:9 4:7	19	5 19:8	5 20:6	5 05:2	1:9 0:7	7:9 2:8	13:9 5:0
20	5 05:0	5 05:8	4 51:1	2:0 0:7	8:0 2:7	14:0 4:8	20	5 20:0	5 20:9	5 05:4	2:0 0:7	8:0 2:9	14:0 5:0
21	5 05:3	5 06:1	4 51:3	2:1 0:7	8:1 2:8	14:1 4:8	21	5 20:3	5 21:1	5 05:7	2:1 0:8	8:1 2:9	14:1 5:1
22	5 05:5	5 06:3	4 51:6	2:2 0:8	8:2 2:8	14:2 4:9	22	5 20:5	5 21:4	5 05:9	2:2 0:8	8:2 2:9	14:2 5:1
23	5 05:8	5 06:6	4 51:8	2:3 0:8	8:3 2:8	14:3 4:9	23	5 20:8	5 21:6	5 06:1	2:3 0:8	8:3 3:0	14:3 5:1
24	5 06:0	5 06:8	4 52:1	2:4 0:8	8:4 2:9	14:4 4:9	24	5 21:0	5 21:9	5 06:4	2:4 0:9	8:4 3:0	14:4 5:2
25	5 06:3	5 07:1	4 52:3	2:5 0:9	8:5 2:9	14:5 5:0	25	5 21:3	5 22:1	5 06:6	2:5 0:9	8:5 3:0	14:5 5:2
26	5 06:5	5 07:3	4 52:5	2:6 0:9	8:6 2:9	14:6 5:0	26	5 21:5	5 22:4	5 06:9	2:6 0:9	8:6 3:1	14:6 5:2
27	5 06:8	5 07:6	4 52:8	2:7 0:9	8:7 3:0	14:7 5:0	27	5 21:8	5 22:6	5 07:1	2:7 1:0	8:7 3:1	14:7 5:3
28	5 07:0	5 07:8	4 53:0	2:8 1:0	8:8 3:0	14:8 5:1	28	5 22:0	5 22:9	5 07:3	2:8 1:0	8:8 3:2	14:8 5:3
29	5 07:3	5 08:1	4 53:3	2:9 1:0	8:9 3:0	14:9 5:1	29	5 22:3	5 23:1	5 07:6	2:9 1:0	8:9 3:2	14:9 5:3
30	5 07:5	5 08:3	4 53:5	3:0 1:0	9:0 3:1	15:0 5:1	30	5 22:5	5 23:4	5 07:8	3:0 1:1	9:0 3:2	15:0 5:4
31	5 07:8	5 08:6	4 53:7	3:1 1:1	9:1 3:1	15:1 5:2	31	5 22:8	5 23:6	5 08:0	3:1 1:1	9:1 3:3	15:1 5:4
32	5 08:0	5 08:8	4 54:0	3:2 1:1	9:2 3:1	15:2 5:2	32	5 23:0	5 23:9	5 08:3	3:2 1:1	9:2 3:3	15:2 5:4
33	5 08:3	5 09:1	4 54:2	3:3 1:1	9:3 3:2	15:3 5:2	33	5 23:3	5 24:1	5 08:5	3:3 1:2	9:3 3:3	15:3 5:5
34	5 08:5	5 09:3	4 54:4	3:4 1:2	9:4 3:2	15:4 5:3	34	5 23:5	5 24:4	5 08:8	3:4 1:2	9:4 3:4	15:4 5:5
35	5 08:8	5 09:6	4 54:7	3:5 1:2	9:5 3:2	15:5 5:3	35	5 23:8	5 24:6	5 09:0	3:5 1:3	9:5 3:4	15:5 5:6
36	5 09:0	5 09:8	4 54:9	3:6 1:2	9:6 3:3	15:6 5:3	36	5 24:0	5 24:9	5 09:2	3:6 1:3	9:6 3:4	15:6 5:6
37	5 09:3	5 10:1	4 55:2	3:7 1:3	9:7 3:3	15:7 5:4	37	5 24:3	5 25:1	5 09:5	3:7 1:3	9:7 3:5	15:7 5:6
38	5 09:5	5 10:3	4 55:4	3:8 1:3	9:8 3:3	15:8 5:4	38	5 24:5	5 25:4	5 09:7	3:8 1:4	9:8 3:5	15:8 5:7
39	5 09:8	5 10:6	4 55:6	3:9 1:3	9:9 3:4	15:9 5:4	39	5 24:8	5 25:6	5 10:0	3:9 1:4	9:9 3:5	15:9 5:7
40	5 10:0	5 10:8	4 55:9	4:0 1:4	10:0 3:4	16:0 5:5	40	5 25:0	5 25:9	5 10:2	4:0 1:4	10:0 3:6	16:0 5:7
41	5 10:3	5 11:1	4 56:1	4:1 1:4	10:1 3:5	16:1 5:5	41	5 25:3	5 26:1	5 10:4	4:1 1:5	10:1 3:6	16:1 5:8
42	5 10:5	5 11:4	4 56:4	4:2 1:4	10:2 3:5	16:2 5:5	42	5 25:5	5 26:4	5 10:7	4:2 1:5	10:2 3:7	16:2 5:8
43	5 10:8	5 11:6	4 56:6	4:3 1:5	10:3 3:5	16:3 5:6	43	5 25:8	5 26:6	5 10:9	4:3 1:5	10:3 3:7	16:3 5:8
44	5 11:0	5 11:9	4 56:8	4:4 1:5	10:4 3:6	16:4 5:6	44	5 26:0	5 26:9	5 11:1	4:4 1:6	10:4 3:7	16:4 5:9
45	5 11:3	5 12:1	4 57:1	4:5 1:5	10:5 3:6	16:5 5:6	45	5 26:3	5 27:1	5 11:4	4:5 1:6	10:5 3:8	16:5 5:9
46	5 11:5	5 12:4	4 57:3	4:6 1:6	10:6 3:6	16:6 5:7	46	5 26:5	5 27:4	5 11:6	4:6 1:6	10:6 3:8	16:6 5:9
47	5 11:8	5 12:6	4 57:5	4:7 1:6	10:7 3:7	16:7 5:7	47	5 26:8	5 27:6	5 11:9	4:7 1:7	10:7 3:8	16:7 6:0
48	5 12:0	5 12:9	4 57:8	4:8 1:6	10:8 3:7	16:8 5:7	48	5 27:0	5 27:9	5 12:1	4:8 1:7	10:8 3:9	16:8 6:0
49	5 12:3	5 13:1	4 58:0	4:9 1:7	10:9 3:7	16:9 5:8	49	5 27:3	5 28:1	5 12:3	4:9 1:8	10:9 3:9	16:9 6:1
50	5 12:5	5 13:4	4 58:3	5:0 1:7	11:0 3:8	17:0 5:8	50	5 27:5	5 28:4	5 12:6	5:0 1:8	11:0 3:9	17:0 6:1
51	5 12:8	5 13:6	4 58:5	5:1 1:7	11:1 3:8	17:1 5:8	51	5 27:8	5 28:6	5 12:8	5:1 1:8	11:1 4:0	17:1 6:1
52	5 13:0	5 13:9	4 58:7	5:2 1:8	11:2 3:8	17:2 5:9	52	5 28:0	5 28:9	5 13:1	5:2 1:9	11:2 4:0	17:2 6:2
53	5 13:3	5 14:1	4 59:0	5:3 1:8	11:3 3:9	17:3 5:9	53	5 28:3	5 29:1	5 13:3	5:3 1:9	11:3 4:0	17:3 6:2
54	5 13:5	5 14:4	4 59:2	5:4 1:8	11:4 3:9	17:4 5:9	54	5 28:5	5 29:4	5 13:5	5:4 1:9	11:4 4:1	17:4 6:2
55	5 13:8	5 14:6	4 59:5	5:5 1:9	11:5 3:9	17:5 6:0	55	5 28:8	5 29:7	5 13:8	5:5 2:0	11:5 4:1	17:5 6:3
56	5 14:0	5 14:9	4 59:7	5:6 1:9	11:6 4:0	17:6 6:0	56	5 29:0	5 29:9	5 14:0	5:6 2:0	11:6 4:2	17:6 6:3
57	5 14:3	5 15:1	4 59:9	5:7 1:9	11:7 4:0	17:7 6:0	57	5 29:3	5 30:2	5 14:3	5:7 2:0	11:7 4:2	17:7 6:3
58	5 14:5	5 15:4	5 00:2	5:8 2:0	11:8 4:0	17:8 6:1	58	5 29:5	5 30:4	5 14:5	5:8 2:1	11:8 4:2	17:8 6:4
59	5 14:8	5 15:6	5 00:4	5:9 2:0	11:9 4:1	17:9 6:1	59	5 29:8	5 30:7	5 14:7	5:9 2:1	11:9 4:3	17:9 6:4
60	5 15:0	5 15:9	5 00:7	6:0 2:1	12:0 4:1	18:0 6:2	60	5 30:0	5 30:9	5 15:0	6:0 2:2	12:0 4:3	18:0 6:5

^m 22	SUN PLANETS	ARIES	MOON	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^m 23	SUN PLANETS	ARIES	MOON	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^v or d	Corr ⁿ
^s 00	° /	° /	° /	/ /	/ /	/ /	/ /	/ /	/ /	^s 00	° /	° /	° /	/ /	/ /	/ /	/ /	/ /	/ /
01	5 30.0	5 30.9	5 15.0	0.0	0.0	6.0	2.3	12.0	4.5	01	5 45.0	5 45.9	5 29.3	0.0	0.0	6.0	2.4	12.0	4.7
02	5 30.3	5 31.2	5 15.2	0.1	0.0	6.1	2.3	12.1	4.5	02	5 45.3	5 46.2	5 29.5	0.1	0.0	6.1	2.4	12.1	4.7
03	5 30.5	5 31.4	5 15.4	0.2	0.1	6.2	2.3	12.2	4.6	03	5 45.5	5 46.4	5 29.8	0.2	0.1	6.2	2.4	12.2	4.8
04	5 30.8	5 31.7	5 15.7	0.3	0.1	6.3	2.4	12.3	4.6	04	5 45.8	5 46.7	5 30.0	0.3	0.1	6.3	2.5	12.3	4.8
05	5 31.0	5 31.9	5 15.9	0.4	0.2	6.4	2.4	12.4	4.7	05	5 46.0	5 46.9	5 30.2	0.4	0.2	6.4	2.5	12.4	4.9
06	5 31.3	5 32.2	5 16.2	0.5	0.2	6.5	2.4	12.5	4.7	06	5 46.3	5 47.2	5 30.5	0.5	0.2	6.5	2.5	12.5	4.9
07	5 31.5	5 32.4	5 16.4	0.6	0.2	6.6	2.5	12.6	4.7	07	5 46.5	5 47.4	5 30.7	0.6	0.2	6.6	2.6	12.6	4.9
08	5 31.8	5 32.7	5 16.6	0.7	0.3	6.7	2.5	12.7	4.8	08	5 46.8	5 47.7	5 31.0	0.7	0.3	6.7	2.6	12.7	5.0
09	5 32.0	5 32.9	5 16.9	0.8	0.3	6.8	2.6	12.8	4.8	09	5 47.0	5 48.0	5 31.2	0.8	0.3	6.8	2.7	12.8	5.0
10	5 32.3	5 33.2	5 17.1	0.9	0.3	6.9	2.6	12.9	4.8	10	5 47.3	5 48.2	5 31.4	0.9	0.4	6.9	2.7	12.9	5.1
11	5 32.5	5 33.4	5 17.4	1.0	0.4	7.0	2.6	13.0	4.9	11	5 47.5	5 48.5	5 31.7	1.0	0.4	7.0	2.7	13.0	5.1
12	5 32.8	5 33.7	5 17.6	1.1	0.4	7.1	2.7	13.1	4.9	12	5 47.8	5 48.7	5 31.9	1.1	0.4	7.1	2.8	13.1	5.1
13	5 33.0	5 33.9	5 17.8	1.2	0.5	7.2	2.7	13.2	5.0	13	5 48.0	5 49.0	5 32.1	1.2	0.5	7.2	2.8	13.2	5.2
14	5 33.3	5 34.2	5 18.1	1.3	0.5	7.3	2.7	13.3	5.0	14	5 48.3	5 49.2	5 32.4	1.3	0.5	7.3	2.9	13.3	5.2
15	5 33.5	5 34.4	5 18.3	1.4	0.5	7.4	2.8	13.4	5.0	15	5 48.5	5 49.5	5 32.6	1.4	0.5	7.4	2.9	13.4	5.2
16	5 33.8	5 34.7	5 18.5	1.5	0.6	7.5	2.8	13.5	5.1	16	5 48.8	5 49.7	5 32.9	1.5	0.6	7.5	2.9	13.5	5.3
17	5 34.0	5 34.9	5 18.8	1.6	0.6	7.6	2.9	13.6	5.1	17	5 49.0	5 50.0	5 33.1	1.6	0.6	7.6	3.0	13.6	5.3
18	5 34.3	5 35.2	5 19.0	1.7	0.6	7.7	2.9	13.7	5.1	18	5 49.3	5 50.2	5 33.3	1.7	0.7	7.7	3.0	13.7	5.4
19	5 34.5	5 35.4	5 19.3	1.8	0.7	7.8	2.9	13.8	5.2	19	5 49.5	5 50.5	5 33.6	1.8	0.7	7.8	3.1	13.8	5.4
20	5 34.8	5 35.7	5 19.5	1.9	0.7	7.9	3.0	13.9	5.2	20	5 49.8	5 50.7	5 33.8	1.9	0.7	7.9	3.1	13.9	5.4
21	5 35.0	5 35.9	5 19.7	2.0	0.8	8.0	3.0	14.0	5.3	21	5 50.0	5 51.0	5 34.1	2.0	0.8	8.0	3.1	14.0	5.5
22	5 35.3	5 36.2	5 20.0	2.1	0.8	8.1	3.0	14.1	5.3	22	5 50.3	5 51.2	5 34.3	2.1	0.8	8.1	3.2	14.1	5.5
23	5 35.5	5 36.4	5 20.2	2.2	0.8	8.2	3.1	14.2	5.3	23	5 50.5	5 51.5	5 34.5	2.2	0.9	8.2	3.2	14.2	5.6
24	5 35.8	5 36.7	5 20.5	2.3	0.9	8.3	3.1	14.3	5.4	24	5 50.8	5 51.7	5 34.8	2.3	0.9	8.3	3.3	14.3	5.6
25	5 36.0	5 36.9	5 20.7	2.4	0.9	8.4	3.2	14.4	5.4	25	5 51.0	5 52.0	5 35.0	2.4	0.9	8.4	3.3	14.4	5.6
26	5 36.3	5 37.2	5 20.9	2.5	0.9	8.5	3.2	14.5	5.4	26	5 51.3	5 52.2	5 35.2	2.5	1.0	8.5	3.3	14.5	5.7
27	5 36.5	5 37.4	5 21.2	2.6	1.0	8.6	3.2	14.6	5.5	27	5 51.5	5 52.5	5 35.5	2.6	1.0	8.6	3.4	14.6	5.7
28	5 36.8	5 37.7	5 21.4	2.7	1.0	8.7	3.3	14.7	5.5	28	5 51.8	5 52.7	5 35.7	2.7	1.1	8.7	3.4	14.7	5.8
29	5 37.0	5 37.9	5 21.6	2.8	1.0	8.8	3.3	14.8	5.6	29	5 52.0	5 53.0	5 36.0	2.8	1.1	8.8	3.4	14.8	5.8
30	5 37.3	5 38.2	5 21.9	2.9	1.1	8.9	3.3	14.9	5.6	30	5 52.3	5 53.2	5 36.2	2.9	1.1	8.9	3.5	14.9	5.8
31	5 37.5	5 38.4	5 22.1	3.0	1.1	9.0	3.4	15.0	5.6	31	5 52.5	5 53.5	5 36.4	3.0	1.2	9.0	3.5	15.0	5.9
32	5 37.8	5 38.7	5 22.4	3.1	1.2	9.1	3.4	15.1	5.7	32	5 52.8	5 53.7	5 36.7	3.1	1.2	9.1	3.6	15.1	5.9
33	5 38.0	5 38.9	5 22.6	3.2	1.2	9.2	3.5	15.2	5.7	33	5 53.0	5 54.0	5 36.9	3.2	1.3	9.2	3.6	15.2	6.0
34	5 38.3	5 39.2	5 22.8	3.3	1.2	9.3	3.5	15.3	5.7	34	5 53.3	5 54.2	5 37.2	3.3	1.3	9.3	3.6	15.3	6.0
35	5 38.5	5 39.4	5 23.1	3.4	1.3	9.4	3.5	15.4	5.8	35	5 53.5	5 54.5	5 37.4	3.4	1.3	9.4	3.7	15.4	6.0
36	5 38.8	5 39.7	5 23.3	3.5	1.3	9.5	3.6	15.5	5.8	36	5 53.8	5 54.7	5 37.6	3.5	1.4	9.5	3.7	15.5	6.1
37	5 39.0	5 39.9	5 23.6	3.6	1.4	9.6	3.6	15.6	5.9	37	5 54.0	5 55.0	5 37.9	3.6	1.4	9.6	3.8	15.6	6.1
38	5 39.3	5 40.2	5 23.8	3.7	1.4	9.7	3.6	15.7	5.9	38	5 54.3	5 55.2	5 38.1	3.7	1.4	9.7	3.8	15.7	6.1
39	5 39.5	5 40.4	5 24.0	3.8	1.4	9.8	3.7	15.8	5.9	39	5 54.5	5 55.5	5 38.4	3.8	1.5	9.8	3.8	15.8	6.2
40	5 39.8	5 40.7	5 24.3	3.9	1.5	9.9	3.7	15.9	6.0	40	5 54.8	5 55.7	5 38.6	3.9	1.5	9.9	3.9	15.9	6.2
41	5 40.0	5 40.9	5 24.5	4.0	1.5	10.0	3.8	16.0	6.0	41	5 55.0	5 56.0	5 38.8	4.0	1.6	10.0	3.9	16.0	6.3
42	5 40.3	5 41.2	5 24.7	4.1	1.5	10.1	3.8	16.1	6.0	42	5 55.3	5 56.2	5 39.1	4.1	1.6	10.1	4.0	16.1	6.3
43	5 40.5	5 41.4	5 25.0	4.2	1.6	10.2	3.8	16.2	6.1	43	5 55.5	5 56.5	5 39.3	4.2	1.6	10.2	4.0	16.2	6.3
44	5 40.8	5 41.7	5 25.2	4.3	1.6	10.3	3.9	16.3	6.1	44	5 55.8	5 56.7	5 39.5	4.3	1.7	10.3	4.0	16.3	6.4
45	5 41.0	5 41.9	5 25.5	4.4	1.7	10.4	3.9	16.4	6.1	45	5 56.0	5 57.0	5 39.8	4.4	1.7	10.4	4.1	16.4	6.4
46	5 41.3	5 42.2	5 25.7	4.5	1.7	10.5	3.9	16.5	6.2	46	5 56.3	5 57.2	5 40.0	4.5	1.8	10.5	4.1	16.5	6.5
47	5 41.5	5 42.4	5 25.9	4.6	1.7	10.6	4.0	16.6	6.2	47	5 56.5	5 57.5	5 40.3	4.6	1.8	10.6	4.2	16.6	6.5
48	5 41.8	5 42.7	5 26.2	4.7	1.8	10.7	4.0	16.7	6.3	48	5 56.8	5 57.7	5 40.5	4.7	1.8	10.7	4.2	16.7	6.5
49	5 42.0	5 42.9	5 26.4	4.8	1.8	10.8	4.1	16.8	6.3	49	5 57.0	5 58.0	5 40.7	4.8	1.9	10.8	4.2	16.8	6.6
50	5 42.3	5 43.2	5 26.7	4.9	1.8	10.9	4.1	16.9	6.3	50	5 57.3	5 58.2	5 41.0	4.9	1.9	10.9	4.3	16.9	6.6
51	5 42.5	5 43.4	5 26.9	5.0	1.9	11.0	4.1	17.0	6.4	51	5 57.5	5 58.5	5 41.2	5.0	2.0	11.0	4.3	17.0	6.7
52	5 42.8	5 43.7	5 27.1	5.1	1.9	11.1	4.2	17.1	6.4	52	5 57.8	5 58.7	5 41.5	5.1	2.0	11.1	4.3	17.1	6.7
53	5 43.0	5 43.9	5 27.4	5.2	2.0	11.2	4.2	17.2	6.5	53	5 58.0	5 59.0	5 41.7	5.2	2.0	11.2	4.4	17.2	6.7
54	5 43.3	5 44.2	5 27.6	5.3	2.0	11.3	4.2	17.3	6.5	54	5 58.3	5 59.2	5 41.9	5.3	2.1	11.3	4.4	17.3	6.8
55	5 43.5	5 44.4	5 27.9	5.4	2.0	11.4	4.3	17.4	6.5	55	5 58.5	5 59.5	5 42.2	5.4	2.1	11.4	4.5	17.4	6.8
56	5 43.8	5 44.7	5 28.1	5.5	2.1	11.5	4.3	17.5	6.6	56	5 58.8	5 59.7	5 42.4	5.5	2.2	11.5	4.5	17.5	6.9
57	5 44.0	5 44.9	5 28.3	5.6	2.1	11.6	4.4	17.6	6.6	57	5 59.0	6 00.0	5 42.6	5.6	2.2	11.6	4.5	17.6	6.9
58	5 44.3	5 45.2	5 28.6	5.7	2.1	11.7	4.4	17.7	6.6	58	5 59.3	6 00.2	5 42.9	5.7	2.2	11.7	4.6	17.7	6.9
59	5 44.5	5 45.4	5 28.8	5.8	2.2	11.8	4.4	17.8	6.7	59	5 59.5	6 00.5	5 43.1	5.8	2.3	11.8	4.6	17.8	7.0
60	5 44.8	5 45.7	5 29.0	5.9	2.2	11.9	4.5	17.9	6.7	60	5 59.8	6 00.7	5 43.4	5.9	2.3	11.9	4.7	17.9	7.0
61	5 45.0	5 45.9	5 29.3	6.0	2.3	12.0	4.5	18.0	6.8										

^m 24	SUN PLANETS	ARIES	MOON	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$
s	° ' "	° ' "	° ' "	' "	' "	' "
00	6 00-0	6 01-0	5 43-6	0-0 0-0	6-0 2-5	12-0 4-9
01	6 00-3	6 01-2	5 43-8	0-1 0-0	6-1 2-5	12-1 4-9
02	6 00-5	6 01-5	5 44-1	0-2 0-1	6-2 2-5	12-2 5-0
03	6 00-8	6 01-7	5 44-3	0-3 0-1	6-3 2-6	12-3 5-0
04	6 01-0	6 02-0	5 44-6	0-4 0-2	6-4 2-6	12-4 5-1
05	6 01-3	6 02-2	5 44-8	0-5 0-2	6-5 2-7	12-5 5-1
06	6 01-5	6 02-5	5 45-0	0-6 0-2	6-6 2-7	12-6 5-1
07	6 01-8	6 02-7	5 45-3	0-7 0-3	6-7 2-7	12-7 5-2
08	6 02-0	6 03-0	5 45-5	0-8 0-3	6-8 2-8	12-8 5-2
09	6 02-3	6 03-2	5 45-7	0-9 0-4	6-9 2-8	12-9 5-3
10	6 02-5	6 03-5	5 46-0	1-0 0-4	7-0 2-9	13-0 5-3
11	6 02-8	6 03-7	5 46-2	1-1 0-4	7-1 2-9	13-1 5-3
12	6 03-0	6 04-0	5 46-5	1-2 0-5	7-2 2-9	13-2 5-4
13	6 03-3	6 04-2	5 46-7	1-3 0-5	7-3 3-0	13-3 5-4
14	6 03-5	6 04-5	5 46-9	1-4 0-6	7-4 3-0	13-4 5-5
15	6 03-8	6 04-7	5 47-2	1-5 0-6	7-5 3-1	13-5 5-5
16	6 04-0	6 05-0	5 47-4	1-6 0-7	7-6 3-1	13-6 5-6
17	6 04-3	6 05-2	5 47-7	1-7 0-7	7-7 3-1	13-7 5-6
18	6 04-5	6 05-5	5 47-9	1-8 0-7	7-8 3-2	13-8 5-6
19	6 04-8	6 05-7	5 48-1	1-9 0-8	7-9 3-2	13-9 5-7
20	6 05-0	6 06-0	5 48-4	2-0 0-8	8-0 3-3	14-0 5-7
21	6 05-3	6 06-3	5 48-6	2-1 0-9	8-1 3-3	14-1 5-8
22	6 05-5	6 06-5	5 48-8	2-2 0-9	8-2 3-3	14-2 5-8
23	6 05-8	6 06-8	5 49-1	2-3 0-9	8-3 3-4	14-3 5-8
24	6 06-0	6 07-0	5 49-3	2-4 1-0	8-4 3-4	14-4 5-9
25	6 06-3	6 07-3	5 49-6	2-5 1-0	8-5 3-5	14-5 5-9
26	6 06-5	6 07-5	5 49-8	2-6 1-1	8-6 3-5	14-6 6-0
27	6 06-8	6 07-8	5 50-0	2-7 1-1	8-7 3-6	14-7 6-0
28	6 07-0	6 08-0	5 50-3	2-8 1-1	8-8 3-6	14-8 6-0
29	6 07-3	6 08-3	5 50-5	2-9 1-2	8-9 3-6	14-9 6-1
30	6 07-5	6 08-5	5 50-8	3-0 1-2	9-0 3-7	15-0 6-1
31	6 07-8	6 08-8	5 51-0	3-1 1-3	9-1 3-7	15-1 6-2
32	6 08-0	6 09-0	5 51-2	3-2 1-3	9-2 3-8	15-2 6-2
33	6 08-3	6 09-3	5 51-5	3-3 1-3	9-3 3-8	15-3 6-2
34	6 08-5	6 09-5	5 51-7	3-4 1-4	9-4 3-8	15-4 6-3
35	6 08-8	6 09-8	5 52-0	3-5 1-4	9-5 3-9	15-5 6-3
36	6 09-0	6 10-0	5 52-2	3-6 1-5	9-6 3-9	15-6 6-4
37	6 09-3	6 10-3	5 52-4	3-7 1-5	9-7 4-0	15-7 6-4
38	6 09-5	6 10-5	5 52-7	3-8 1-6	9-8 4-0	15-8 6-5
39	6 09-8	6 10-8	5 52-9	3-9 1-6	9-9 4-0	15-9 6-5
40	6 10-0	6 11-0	5 53-1	4-0 1-6	10-0 4-1	16-0 6-5
41	6 10-3	6 11-3	5 53-4	4-1 1-7	10-1 4-1	16-1 6-6
42	6 10-5	6 11-5	5 53-6	4-2 1-7	10-2 4-2	16-2 6-6
43	6 10-8	6 11-8	5 53-9	4-3 1-8	10-3 4-2	16-3 6-7
44	6 11-0	6 12-0	5 54-1	4-4 1-8	10-4 4-2	16-4 6-7
45	6 11-3	6 12-3	5 54-3	4-5 1-8	10-5 4-3	16-5 6-7
46	6 11-5	6 12-5	5 54-6	4-6 1-9	10-6 4-3	16-6 6-8
47	6 11-8	6 12-8	5 54-8	4-7 1-9	10-7 4-4	16-7 6-8
48	6 12-0	6 13-0	5 55-1	4-8 2-0	10-8 4-4	16-8 6-9
49	6 12-3	6 13-3	5 55-3	4-9 2-0	10-9 4-5	16-9 6-9
50	6 12-5	6 13-5	5 55-5	5-0 2-0	11-0 4-5	17-0 6-9
51	6 12-8	6 13-8	5 55-8	5-1 2-1	11-1 4-5	17-1 7-0
52	6 13-0	6 14-0	5 56-0	5-2 2-1	11-2 4-6	17-2 7-0
53	6 13-3	6 14-3	5 56-2	5-3 2-2	11-3 4-6	17-3 7-1
54	6 13-5	6 14-5	5 56-5	5-4 2-2	11-4 4-7	17-4 7-1
55	6 13-8	6 14-8	5 56-7	5-5 2-2	11-5 4-7	17-5 7-1
56	6 14-0	6 15-0	5 57-0	5-6 2-3	11-6 4-7	17-6 7-2
57	6 14-3	6 15-3	5 57-2	5-7 2-3	11-7 4-8	17-7 7-2
58	6 14-5	6 15-5	5 57-4	5-8 2-4	11-8 4-8	17-8 7-3
59	6 14-8	6 15-8	5 57-7	5-9 2-4	11-9 4-9	17-9 7-3
60	6 15-0	6 16-0	5 57-9	6-0 2-5	12-0 4-9	18-0 7-4

^m 25	SUN PLANETS	ARIES	MOON	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$
s	° ' "	° ' "	° ' "	' "	' "	' "
00	6 15-0	6 16-0	5 57-9	0-0 0-0	6-0 2-6	12-0 5-1
01	6 15-3	6 16-3	5 58-2	0-1 0-0	6-1 2-6	12-1 5-1
02	6 15-5	6 16-5	5 58-4	0-2 0-1	6-2 2-6	12-2 5-2
03	6 15-8	6 16-8	5 58-6	0-3 0-1	6-3 2-7	12-3 5-2
04	6 16-0	6 17-0	5 58-9	0-4 0-2	6-4 2-7	12-4 5-3
05	6 16-3	6 17-3	5 59-1	0-5 0-2	6-5 2-8	12-5 5-3
06	6 16-5	6 17-5	5 59-3	0-6 0-3	6-6 2-8	12-6 5-4
07	6 16-8	6 17-8	5 59-6	0-7 0-3	6-7 2-8	12-7 5-4
08	6 17-0	6 18-0	5 59-8	0-8 0-3	6-8 2-9	12-8 5-4
09	6 17-3	6 18-3	6 00-1	0-9 0-4	6-9 2-9	12-9 5-5
10	6 17-5	6 18-5	6 00-3	1-0 0-4	7-0 3-0	13-0 5-5
11	6 17-8	6 18-8	6 00-5	1-1 0-5	7-1 3-0	13-1 5-6
12	6 18-0	6 19-0	6 00-8	1-2 0-5	7-2 3-1	13-2 5-6
13	6 18-3	6 19-3	6 01-0	1-3 0-6	7-3 3-1	13-3 5-7
14	6 18-5	6 19-5	6 01-3	1-4 0-6	7-4 3-1	13-4 5-7
15	6 18-8	6 19-8	6 01-5	1-5 0-6	7-5 3-2	13-5 5-7
16	6 19-0	6 20-0	6 01-7	1-6 0-7	7-6 3-2	13-6 5-8
17	6 19-3	6 20-3	6 02-0	1-7 0-7	7-7 3-3	13-7 5-8
18	6 19-5	6 20-5	6 02-2	1-8 0-8	7-8 3-3	13-8 5-9
19	6 19-8	6 20-8	6 02-5	1-9 0-8	7-9 3-4	13-9 5-9
20	6 20-0	6 21-0	6 02-7	2-0 0-9	8-0 3-4	14-0 6-0
21	6 20-3	6 21-3	6 02-9	2-1 0-9	8-1 3-4	14-1 6-0
22	6 20-5	6 21-5	6 03-2	2-2 0-9	8-2 3-5	14-2 6-0
23	6 20-8	6 21-8	6 03-4	2-3 1-0	8-3 3-5	14-3 6-1
24	6 21-0	6 22-0	6 03-6	2-4 1-0	8-4 3-6	14-4 6-1
25	6 21-3	6 22-3	6 03-9	2-5 1-1	8-5 3-6	14-5 6-2
26	6 21-5	6 22-5	6 04-1	2-6 1-1	8-6 3-7	14-6 6-2
27	6 21-8	6 22-8	6 04-4	2-7 1-1	8-7 3-7	14-7 6-2
28	6 22-0	6 23-0	6 04-6	2-8 1-2	8-8 3-7	14-8 6-3
29	6 22-3	6 23-3	6 04-8	2-9 1-2	8-9 3-8	14-9 6-3
30	6 22-5	6 23-5	6 05-1	3-0 1-3	9-0 3-8	15-0 6-4
31	6 22-8	6 23-8	6 05-3	3-1 1-3	9-1 3-9	15-1 6-4
32	6 23-0	6 24-0	6 05-6	3-2 1-4	9-2 3-9	15-2 6-5
33	6 23-3	6 24-3	6 05-8	3-3 1-4	9-3 4-0	15-3 6-5
34	6 23-5	6 24-5	6 06-0	3-4 1-4	9-4 4-0	15-4 6-5
35	6 23-8	6 24-8	6 06-3	3-5 1-5	9-5 4-0	15-5 6-6
36	6 24-0	6 25-1	6 06-5	3-6 1-5	9-6 4-1	15-6 6-6
37	6 24-3	6 25-3	6 06-7	3-7 1-6	9-7 4-1	15-7 6-7
38	6 24-5	6 25-6	6 07-0	3-8 1-6	9-8 4-2	15-8 6-7
39	6 24-8	6 25-8	6 07-2	3-9 1-7	9-9 4-2	15-9 6-8
40	6 25-0	6 26-1	6 07-5	4-0 1-7	10-0 4-3	16-0 6-8
41	6 25-3	6 26-3	6 07-7	4-1 1-7	10-1 4-3	16-1 6-8
42	6 25-5	6 26-6	6 07-9	4-2 1-8	10-2 4-3	16-2 6-9
43	6 25-8	6 26-8	6 08-2	4-3 1-8	10-3 4-4	16-3 6-9
44	6 26-0	6 27-1	6 08-4	4-4 1-9	10-4 4-4	16-4 7-0
45	6 26-3	6 27-3	6 08-7	4-5 1-9	10-5 4-5	16-5 7-0
46	6 26-5	6 27-6	6 08-9	4-6 2-0	10-6 4-5	16-6 7-1
47	6 26-8	6 27-8	6 09-1	4-7 2-0	10-7 4-5	16-7 7-1
48	6 27-0	6 28-1	6 09-4	4-8 2-0	10-8 4-6	16-8 7-1
49	6 27-3	6 28-3	6 09-6	4-9 2-1	10-9 4-6	16-9 7-2
50	6 27-5	6 28-6	6 09-8	5-0 2-1	11-0 4-7	17-0 7-2
51	6 27-8	6 28-8	6 10-1	5-1 2-2	11-1 4-7	17-1 7-3
52	6 28-0	6 29-1	6 10-3	5-2 2-2	11-2 4-8	17-2 7-3
53	6 28-3	6 29-3	6 10-6	5-3 2-3	11-3 4-8	17-3 7-4
54	6 28-5	6 29-6	6 10-8	5-4 2-3	11-4 4-8	17-4 7-4
55	6 28-8	6 29-8	6 11-0	5-5 2-3	11-5 4-9	17-5 7-4
56	6 29-0	6 30-1	6 11-3	5-6 2-4	11-6 4-9	17-6 7-5
57	6 29-3	6 30-3	6 11-5	5-7 2-4	11-7 5-0	17-7 7-5
58	6 29-5	6 30-6	6 11-8	5-8 2-5	11-8 5-0	17-8 7-6
59	6 29-8	6 30-8	6 12-0	5-9 2-5	11-9 5-1	17-9 7-6
60	6 30-0	6 31-1	6 12-2	6-0 2-6	12-0 5-1	18-0 7-7

26 ^m	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	6 30-0	6 31-1	6 12-2	0-0 0-0	6-0 2-7	12-0 5-3
01	6 30-3	6 31-3	6 12-5	0-1 0-0	6-1 2-7	12-1 5-3
02	6 30-5	6 31-6	6 12-7	0-2 0-1	6-2 2-7	12-2 5-4
03	6 30-8	6 31-8	6 12-9	0-3 0-1	6-3 2-8	12-3 5-4
04	6 31-0	6 32-1	6 13-2	0-4 0-2	6-4 2-8	12-4 5-5
05	6 31-3	6 32-3	6 13-4	0-5 0-2	6-5 2-9	12-5 5-5
06	6 31-5	6 32-6	6 13-7	0-6 0-3	6-6 2-9	12-6 5-6
07	6 31-8	6 32-8	6 13-9	0-7 0-3	6-7 3-0	12-7 5-6
08	6 32-0	6 33-1	6 14-1	0-8 0-4	6-8 3-0	12-8 5-7
09	6 32-3	6 33-3	6 14-4	0-9 0-4	6-9 3-0	12-9 5-7
10	6 32-5	6 33-6	6 14-6	1-0 0-4	7-0 3-1	13-0 5-7
11	6 32-8	6 33-8	6 14-9	1-1 0-5	7-1 3-1	13-1 5-8
12	6 33-0	6 34-1	6 15-1	1-2 0-5	7-2 3-2	13-2 5-8
13	6 33-3	6 34-3	6 15-3	1-3 0-6	7-3 3-2	13-3 5-9
14	6 33-5	6 34-6	6 15-6	1-4 0-6	7-4 3-3	13-4 5-9
15	6 33-8	6 34-8	6 15-8	1-5 0-7	7-5 3-3	13-5 6-0
16	6 34-0	6 35-1	6 16-1	1-6 0-7	7-6 3-4	13-6 6-0
17	6 34-3	6 35-3	6 16-3	1-7 0-8	7-7 3-4	13-7 6-1
18	6 34-5	6 35-6	6 16-5	1-8 0-8	7-8 3-4	13-8 6-1
19	6 34-8	6 35-8	6 16-8	1-9 0-8	7-9 3-5	13-9 6-1
20	6 35-0	6 36-1	6 17-0	2-0 0-9	8-0 3-5	14-0 6-2
21	6 35-3	6 36-3	6 17-2	2-1 0-9	8-1 3-6	14-1 6-2
22	6 35-5	6 36-6	6 17-5	2-2 1-0	8-2 3-6	14-2 6-3
23	6 35-8	6 36-8	6 17-7	2-3 1-0	8-3 3-7	14-3 6-3
24	6 36-0	6 37-1	6 18-0	2-4 1-1	8-4 3-7	14-4 6-4
25	6 36-3	6 37-3	6 18-2	2-5 1-1	8-5 3-8	14-5 6-4
26	6 36-5	6 37-6	6 18-4	2-6 1-1	8-6 3-8	14-6 6-4
27	6 36-8	6 37-8	6 18-7	2-7 1-2	8-7 3-8	14-7 6-5
28	6 37-0	6 38-1	6 18-9	2-8 1-2	8-8 3-9	14-8 6-5
29	6 37-3	6 38-3	6 19-2	2-9 1-3	8-9 3-9	14-9 6-6
30	6 37-5	6 38-6	6 19-4	3-0 1-3	9-0 4-0	15-0 6-6
31	6 37-8	6 38-8	6 19-6	3-1 1-4	9-1 4-0	15-1 6-7
32	6 38-0	6 39-1	6 19-9	3-2 1-4	9-2 4-1	15-2 6-7
33	6 38-3	6 39-3	6 20-1	3-3 1-5	9-3 4-1	15-3 6-8
34	6 38-5	6 39-6	6 20-3	3-4 1-5	9-4 4-2	15-4 6-8
35	6 38-8	6 39-8	6 20-6	3-5 1-5	9-5 4-2	15-5 6-8
36	6 39-0	6 40-1	6 20-8	3-6 1-6	9-6 4-2	15-6 6-9
37	6 39-3	6 40-3	6 21-1	3-7 1-6	9-7 4-3	15-7 6-9
38	6 39-5	6 40-6	6 21-3	3-8 1-7	9-8 4-3	15-8 7-0
39	6 39-8	6 40-8	6 21-5	3-9 1-7	9-9 4-4	15-9 7-0
40	6 40-0	6 41-1	6 21-8	4-0 1-8	10-0 4-4	16-0 7-1
41	6 40-3	6 41-3	6 22-0	4-1 1-8	10-1 4-5	16-1 7-1
42	6 40-5	6 41-6	6 22-3	4-2 1-9	10-2 4-5	16-2 7-2
43	6 40-8	6 41-8	6 22-5	4-3 1-9	10-3 4-5	16-3 7-2
44	6 41-0	6 42-1	6 22-7	4-4 1-9	10-4 4-6	16-4 7-2
45	6 41-3	6 42-3	6 23-0	4-5 2-0	10-5 4-6	16-5 7-3
46	6 41-5	6 42-6	6 23-2	4-6 2-0	10-6 4-7	16-6 7-3
47	6 41-8	6 42-8	6 23-4	4-7 2-1	10-7 4-7	16-7 7-4
48	6 42-0	6 43-1	6 23-7	4-8 2-1	10-8 4-8	16-8 7-4
49	6 42-3	6 43-4	6 23-9	4-9 2-2	10-9 4-8	16-9 7-5
50	6 42-5	6 43-6	6 24-2	5-0 2-2	11-0 4-9	17-0 7-5
51	6 42-8	6 43-9	6 24-4	5-1 2-3	11-1 4-9	17-1 7-6
52	6 43-0	6 44-1	6 24-6	5-2 2-3	11-2 4-9	17-2 7-6
53	6 43-3	6 44-4	6 24-9	5-3 2-3	11-3 5-0	17-3 7-6
54	6 43-5	6 44-6	6 25-1	5-4 2-4	11-4 5-0	17-4 7-7
55	6 43-8	6 44-9	6 25-4	5-5 2-4	11-5 5-1	17-5 7-7
56	6 44-0	6 45-1	6 25-6	5-6 2-5	11-6 5-1	17-6 7-8
57	6 44-3	6 45-4	6 25-8	5-7 2-5	11-7 5-2	17-7 7-8
58	6 44-5	6 45-6	6 26-1	5-8 2-6	11-8 5-2	17-8 7-9
59	6 44-8	6 45-9	6 26-3	5-9 2-6	11-9 5-3	17-9 7-9
60	6 45-0	6 46-1	6 26-6	6-0 2-7	12-0 5-3	18-0 8-0

27 ^m	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	6 45-0	6 46-1	6 26-6	0-0 0-0	6-0 2-8	12-0 5-5
01	6 45-3	6 46-4	6 26-8	0-1 0-0	6-1 2-8	12-1 5-5
02	6 45-5	6 46-6	6 27-0	0-2 0-1	6-2 2-8	12-2 5-6
03	6 45-8	6 46-9	6 27-3	0-3 0-1	6-3 2-9	12-3 5-6
04	6 46-0	6 47-1	6 27-5	0-4 0-2	6-4 2-9	12-4 5-7
05	6 46-3	6 47-4	6 27-7	0-5 0-2	6-5 3-0	12-5 5-7
06	6 46-5	6 47-6	6 28-0	0-6 0-3	6-6 3-0	12-6 5-8
07	6 46-8	6 47-9	6 28-2	0-7 0-3	6-7 3-1	12-7 5-8
08	6 47-0	6 48-1	6 28-5	0-8 0-4	6-8 3-1	12-8 5-9
09	6 47-3	6 48-4	6 28-7	0-9 0-4	6-9 3-2	12-9 5-9
10	6 47-5	6 48-6	6 28-9	1-0 0-5	7-0 3-2	13-0 6-0
11	6 47-8	6 48-9	6 29-2	1-1 0-5	7-1 3-3	13-1 6-0
12	6 48-0	6 49-1	6 29-4	1-2 0-6	7-2 3-3	13-2 6-1
13	6 48-3	6 49-4	6 29-7	1-3 0-6	7-3 3-3	13-3 6-1
14	6 48-5	6 49-6	6 29-9	1-4 0-6	7-4 3-4	13-4 6-1
15	6 48-8	6 49-9	6 30-1	1-5 0-7	7-5 3-4	13-5 6-2
16	6 49-0	6 50-1	6 30-4	1-6 0-7	7-6 3-5	13-6 6-2
17	6 49-3	6 50-4	6 30-6	1-7 0-8	7-7 3-5	13-7 6-3
18	6 49-5	6 50-6	6 30-8	1-8 0-8	7-8 3-6	13-8 6-3
19	6 49-8	6 50-9	6 31-1	1-9 0-9	7-9 3-6	13-9 6-4
20	6 50-0	6 51-1	6 31-3	2-0 0-9	8-0 3-7	14-0 6-4
21	6 50-3	6 51-4	6 31-6	2-1 1-0	8-1 3-7	14-1 6-5
22	6 50-5	6 51-6	6 31-8	2-2 1-0	8-2 3-8	14-2 6-5
23	6 50-8	6 51-9	6 32-0	2-3 1-1	8-3 3-8	14-3 6-6
24	6 51-0	6 52-1	6 32-3	2-4 1-1	8-4 3-9	14-4 6-6
25	6 51-3	6 52-4	6 32-5	2-5 1-1	8-5 3-9	14-5 6-6
26	6 51-5	6 52-6	6 32-8	2-6 1-2	8-6 3-9	14-6 6-7
27	6 51-8	6 52-9	6 33-0	2-7 1-2	8-7 4-0	14-7 6-7
28	6 52-0	6 53-1	6 33-2	2-8 1-3	8-8 4-0	14-8 6-8
29	6 52-3	6 53-4	6 33-5	2-9 1-3	8-9 4-1	14-9 6-8
30	6 52-5	6 53-6	6 33-7	3-0 1-4	9-0 4-1	15-0 6-9
31	6 52-8	6 53-9	6 33-9	3-1 1-4	9-1 4-2	15-1 6-9
32	6 53-0	6 54-1	6 34-2	3-2 1-5	9-2 4-2	15-2 7-0
33	6 53-3	6 54-4	6 34-4	3-3 1-5	9-3 4-3	15-3 7-0
34	6 53-5	6 54-6	6 34-7	3-4 1-6	9-4 4-3	15-4 7-1
35	6 53-8	6 54-9	6 34-9	3-5 1-6	9-5 4-4	15-5 7-1
36	6 54-0	6 55-1	6 35-1	3-6 1-7	9-6 4-4	15-6 7-2
37	6 54-3	6 55-4	6 35-4	3-7 1-7	9-7 4-4	15-7 7-2
38	6 54-5	6 55-6	6 35-6	3-8 1-7	9-8 4-5	15-8 7-2
39	6 54-8	6 55-9	6 35-9	3-9 1-8	9-9 4-5	15-9 7-3
40	6 55-0	6 56-1	6 36-1	4-0 1-8	10-0 4-6	16-0 7-3
41	6 55-3	6 56-4	6 36-3	4-1 1-9	10-1 4-6	16-1 7-4
42	6 55-5	6 56-6	6 36-6	4-2 1-9	10-2 4-7	16-2 7-4
43	6 55-8	6 56-9	6 36-8	4-3 2-0	10-3 4-7	16-3 7-5
44	6 56-0	6 57-1	6 37-0	4-4 2-0	10-4 4-8	16-4 7-5
45	6 56-3	6 57-4	6 37-3	4-5 2-1	10-5 4-8	16-5 7-6
46	6 56-5	6 57-6	6 37-5	4-6 2-1	10-6 4-9	16-6 7-6
47	6 56-8	6 57-9	6 37-8	4-7 2-2	10-7 4-9	16-7 7-7
48	6 57-0	6 58-1	6 38-0	4-8 2-2	10-8 5-0	16-8 7-7
49	6 57-3	6 58-4	6 38-2	4-9 2-2	10-9 5-0	16-9 7-7
50	6 57-5	6 58-6	6 38-5	5-0 2-3	11-0 5-0	17-0 7-8
51	6 57-8	6 58-9	6 38-7	5-1 2-3	11-1 5-1	17-1 7-8
52	6 58-0	6 59-1	6 39-0	5-2 2-4	11-2 5-1	17-2 7-9
53	6 58-3	6 59-4	6 39-2	5-3 2-4	11-3 5-2	17-3 7-9
54	6 58-5	6 59-6	6 39-4	5-4 2-5	11-4 5-2	17-4 8-0
55	6 58-8	6 59-9	6 39-7	5-5 2-5	11-5 5-3	17-5 8-0
56	6 59-0	7 00-1	6 39-9	5-6 2-6	11-6 5-3	17-6 8-1
57	6 59-3	7 00-4	6 40-2	5-7 2-6	11-7 5-4	17-7 8-1
58	6 59-5	7 00-6	6 40-4	5-8 2-7	11-8 5-4	17-8 8-2
59	6 59-8	7 00-9	6 40-6	5-9 2-7	11-9 5-5	17-9 8-2
60	7 00-0	7 01-1	6 40-9	6-0 2-8	12-0 5-5	18-0 8-3

^m 28	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ	^m 29	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /
00	7 00-0	7 01-1	6 40-9	0-0 0-0	6-0 2-9	12-0 5-7	00	7 15-0	7 16-2	6 55-2	0-0 0-0	6-0 3-0	12-0 5-9
01	7 00-3	7 01-4	6 41-1	0-1 0-0	6-1 2-9	12-1 5-7	01	7 15-3	7 16-4	6 55-4	0-1 0-0	6-1 3-0	12-1 5-9
02	7 00-5	7 01-7	6 41-3	0-2 0-1	6-2 2-9	12-2 5-8	02	7 15-5	7 16-7	6 55-7	0-2 0-1	6-2 3-0	12-2 6-0
03	7 00-8	7 01-9	6 41-6	0-3 0-1	6-3 3-0	12-3 5-8	03	7 15-8	7 16-9	6 55-9	0-3 0-1	6-3 3-1	12-3 6-0
04	7 01-0	7 02-2	6 41-8	0-4 0-2	6-4 3-0	12-4 5-9	04	7 16-0	7 17-2	6 56-1	0-4 0-2	6-4 3-1	12-4 6-1
05	7 01-3	7 02-4	6 42-1	0-5 0-2	6-5 3-1	12-5 5-9	05	7 16-3	7 17-4	6 56-4	0-5 0-2	6-5 3-2	12-5 6-1
06	7 01-5	7 02-7	6 42-3	0-6 0-3	6-6 3-1	12-6 6-0	06	7 16-5	7 17-7	6 56-6	0-6 0-3	6-6 3-2	12-6 6-2
07	7 01-8	7 02-9	6 42-5	0-7 0-3	6-7 3-2	12-7 6-0	07	7 16-8	7 17-9	6 56-9	0-7 0-3	6-7 3-3	12-7 6-2
08	7 02-0	7 03-2	6 42-8	0-8 0-4	6-8 3-2	12-8 6-1	08	7 17-0	7 18-2	6 57-1	0-8 0-4	6-8 3-3	12-8 6-3
09	7 02-3	7 03-4	6 43-0	0-9 0-4	6-9 3-3	12-9 6-1	09	7 17-3	7 18-4	6 57-3	0-9 0-4	6-9 3-4	12-9 6-3
10	7 02-5	7 03-7	6 43-3	1-0 0-5	7-0 3-3	13-0 6-2	10	7 17-5	7 18-7	6 57-6	1-0 0-5	7-0 3-4	13-0 6-4
11	7 02-8	7 03-9	6 43-5	1-1 0-5	7-1 3-4	13-1 6-2	11	7 17-8	7 18-9	6 57-8	1-1 0-5	7-1 3-5	13-1 6-4
12	7 03-0	7 04-2	6 43-7	1-2 0-6	7-2 3-4	13-2 6-3	12	7 18-0	7 19-2	6 58-0	1-2 0-6	7-2 3-5	13-2 6-5
13	7 03-3	7 04-4	6 44-0	1-3 0-6	7-3 3-5	13-3 6-3	13	7 18-3	7 19-4	6 58-3	1-3 0-6	7-3 3-6	13-3 6-5
14	7 03-5	7 04-7	6 44-2	1-4 0-7	7-4 3-5	13-4 6-4	14	7 18-5	7 19-7	6 58-5	1-4 0-7	7-4 3-6	13-4 6-6
15	7 03-8	7 04-9	6 44-4	1-5 0-7	7-5 3-6	13-5 6-4	15	7 18-8	7 20-0	6 58-8	1-5 0-7	7-5 3-7	13-5 6-6
16	7 04-0	7 05-2	6 44-7	1-6 0-8	7-6 3-6	13-6 6-5	16	7 19-0	7 20-2	6 59-0	1-6 0-8	7-6 3-7	13-6 6-7
17	7 04-3	7 05-4	6 44-9	1-7 0-8	7-7 3-7	13-7 6-5	17	7 19-3	7 20-5	6 59-2	1-7 0-8	7-7 3-8	13-7 6-7
18	7 04-5	7 05-7	6 45-2	1-8 0-9	7-8 3-7	13-8 6-6	18	7 19-5	7 20-7	6 59-5	1-8 0-9	7-8 3-8	13-8 6-8
19	7 04-8	7 05-9	6 45-4	1-9 0-9	7-9 3-8	13-9 6-6	19	7 19-8	7 21-0	6 59-7	1-9 0-9	7-9 3-9	13-9 6-8
20	7 05-0	7 06-2	6 45-6	2-0 1-0	8-0 3-8	14-0 6-7	20	7 20-0	7 21-2	7 00-0	2-0 1-0	8-0 3-9	14-0 6-9
21	7 05-3	7 06-4	6 45-9	2-1 1-0	8-1 3-8	14-1 6-7	21	7 20-3	7 21-5	7 00-2	2-1 1-0	8-1 4-0	14-1 6-9
22	7 05-5	7 06-7	6 46-1	2-2 1-0	8-2 3-9	14-2 6-7	22	7 20-5	7 21-7	7 00-4	2-2 1-1	8-2 4-0	14-2 7-0
23	7 05-8	7 06-9	6 46-4	2-3 1-1	8-3 3-9	14-3 6-8	23	7 20-8	7 22-0	7 00-7	2-3 1-1	8-3 4-1	14-3 7-0
24	7 06-0	7 07-2	6 46-6	2-4 1-1	8-4 4-0	14-4 6-8	24	7 21-0	7 22-2	7 00-9	2-4 1-2	8-4 4-1	14-4 7-1
25	7 06-3	7 07-4	6 46-8	2-5 1-2	8-5 4-0	14-5 6-9	25	7 21-3	7 22-5	7 01-1	2-5 1-2	8-5 4-2	14-5 7-1
26	7 06-5	7 07-7	6 47-1	2-6 1-2	8-6 4-1	14-6 6-9	26	7 21-5	7 22-7	7 01-4	2-6 1-3	8-6 4-2	14-6 7-2
27	7 06-8	7 07-9	6 47-3	2-7 1-3	8-7 4-1	14-7 7-0	27	7 21-8	7 23-0	7 01-6	2-7 1-3	8-7 4-3	14-7 7-2
28	7 07-0	7 08-2	6 47-5	2-8 1-3	8-8 4-2	14-8 7-0	28	7 22-0	7 23-2	7 01-9	2-8 1-4	8-8 4-3	14-8 7-3
29	7 07-3	7 08-4	6 47-8	2-9 1-4	8-9 4-2	14-9 7-1	29	7 22-3	7 23-5	7 02-1	2-9 1-4	8-9 4-4	14-9 7-3
30	7 07-5	7 08-7	6 48-0	3-0 1-4	9-0 4-3	15-0 7-1	30	7 22-5	7 23-7	7 02-3	3-0 1-5	9-0 4-4	15-0 7-4
31	7 07-8	7 08-9	6 48-3	3-1 1-5	9-1 4-3	15-1 7-2	31	7 22-8	7 24-0	7 02-6	3-1 1-5	9-1 4-5	15-1 7-4
32	7 08-0	7 09-2	6 48-5	3-2 1-5	9-2 4-4	15-2 7-2	32	7 23-0	7 24-2	7 02-8	3-2 1-6	9-2 4-5	15-2 7-5
33	7 08-3	7 09-4	6 48-7	3-3 1-6	9-3 4-4	15-3 7-3	33	7 23-3	7 24-5	7 03-1	3-3 1-6	9-3 4-6	15-3 7-5
34	7 08-5	7 09-7	6 49-0	3-4 1-6	9-4 4-5	15-4 7-3	34	7 23-5	7 24-7	7 03-3	3-4 1-7	9-4 4-6	15-4 7-6
35	7 08-8	7 09-9	6 49-2	3-5 1-7	9-5 4-5	15-5 7-4	35	7 23-8	7 25-0	7 03-5	3-5 1-7	9-5 4-7	15-5 7-6
36	7 09-0	7 10-2	6 49-5	3-6 1-7	9-6 4-6	15-6 7-4	36	7 24-0	7 25-2	7 03-8	3-6 1-8	9-6 4-7	15-6 7-7
37	7 09-3	7 10-4	6 49-7	3-7 1-8	9-7 4-6	15-7 7-5	37	7 24-3	7 25-5	7 04-0	3-7 1-8	9-7 4-8	15-7 7-7
38	7 09-5	7 10-7	6 49-9	3-8 1-8	9-8 4-7	15-8 7-5	38	7 24-5	7 25-7	7 04-3	3-8 1-9	9-8 4-8	15-8 7-8
39	7 09-8	7 10-9	6 50-2	3-9 1-9	9-9 4-7	15-9 7-6	39	7 24-8	7 26-0	7 04-5	3-9 1-9	9-9 4-9	15-9 7-8
40	7 10-0	7 11-2	6 50-4	4-0 1-9	10-0 4-8	16-0 7-6	40	7 25-0	7 26-2	7 04-7	4-0 2-0	10-0 4-9	16-0 7-9
41	7 10-3	7 11-4	6 50-6	4-1 1-9	10-1 4-8	16-1 7-6	41	7 25-3	7 26-5	7 05-0	4-1 2-0	10-1 5-0	16-1 7-9
42	7 10-5	7 11-7	6 50-9	4-2 2-0	10-2 4-8	16-2 7-7	42	7 25-5	7 26-7	7 05-2	4-2 2-1	10-2 5-0	16-2 8-0
43	7 10-8	7 11-9	6 51-1	4-3 2-0	10-3 4-9	16-3 7-7	43	7 25-8	7 27-0	7 05-4	4-3 2-1	10-3 5-1	16-3 8-0
44	7 11-0	7 12-2	6 51-4	4-4 2-1	10-4 4-9	16-4 7-8	44	7 26-0	7 27-2	7 05-7	4-4 2-2	10-4 5-1	16-4 8-1
45	7 11-3	7 12-4	6 51-6	4-5 2-1	10-5 5-0	16-5 7-8	45	7 26-3	7 27-5	7 05-9	4-5 2-2	10-5 5-2	16-5 8-1
46	7 11-5	7 12-7	6 51-8	4-6 2-2	10-6 5-0	16-6 7-9	46	7 26-5	7 27-7	7 06-2	4-6 2-3	10-6 5-2	16-6 8-2
47	7 11-8	7 12-9	6 52-1	4-7 2-2	10-7 5-1	16-7 7-9	47	7 26-8	7 28-0	7 06-4	4-7 2-3	10-7 5-3	16-7 8-2
48	7 12-0	7 13-2	6 52-3	4-8 2-3	10-8 5-1	16-8 8-0	48	7 27-0	7 28-2	7 06-6	4-8 2-4	10-8 5-3	16-8 8-3
49	7 12-3	7 13-4	6 52-6	4-9 2-3	10-9 5-2	16-9 8-0	49	7 27-3	7 28-5	7 06-9	4-9 2-4	10-9 5-4	16-9 8-3
50	7 12-5	7 13-7	6 52-8	5-0 2-4	11-0 5-2	17-0 8-1	50	7 27-5	7 28-7	7 07-1	5-0 2-5	11-0 5-4	17-0 8-4
51	7 12-8	7 13-9	6 53-0	5-1 2-4	11-1 5-3	17-1 8-1	51	7 27-8	7 29-0	7 07-4	5-1 2-5	11-1 5-5	17-1 8-4
52	7 13-0	7 14-2	6 53-3	5-2 2-5	11-2 5-3	17-2 8-2	52	7 28-0	7 29-2	7 07-6	5-2 2-6	11-2 5-5	17-2 8-5
53	7 13-3	7 14-4	6 53-5	5-3 2-5	11-3 5-4	17-3 8-2	53	7 28-3	7 29-5	7 07-8	5-3 2-6	11-3 5-6	17-3 8-5
54	7 13-5	7 14-7	6 53-8	5-4 2-6	11-4 5-4	17-4 8-3	54	7 28-5	7 29-7	7 08-1	5-4 2-7	11-4 5-6	17-4 8-6
55	7 13-8	7 14-9	6 54-0	5-5 2-6	11-5 5-5	17-5 8-3	55	7 28-8	7 30-0	7 08-3	5-5 2-7	11-5 5-7	17-5 8-6
56	7 14-0	7 15-2	6 54-2	5-6 2-7	11-6 5-5	17-6 8-4	56	7 29-0	7 30-2	7 08-5	5-6 2-8	11-6 5-7	17-6 8-7
57	7 14-3	7 15-4	6 54-5	5-7 2-7	11-7 5-6	17-7 8-4	57	7 29-3	7 30-5	7 08-8	5-7 2-8	11-7 5-8	17-7 8-7
58	7 14-5	7 15-7	6 54-7	5-8 2-8	11-8 5-6	17-8 8-5	58	7 29-5	7 30-7	7 09-0	5-8 2-9	11-8 5-8	17-8 8-8
59	7 14-8	7 15-9	6 54-9	5-9 2-8	11-9 5-7	17-9 8-5	59	7 29-8	7 31-0	7 09-3	5-9 2-9	11-9 5-9	17-9 8-8
60	7 15-0	7 16-2	6 55-2	6-0 2-9	12-0 5-7	18-0 8-6	60	7 30-0	7 31-2	7 09-5	6-0 3-0	12-0 5-9	18-0 8-9

^m 30	SUN PLANETS	ARIES	MOON	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$
s	o /	o /	o /	/ /	/ /	/ /
00	7 30.0	7 31.2	7 09.5	0.0 0.0	6.0 3.1	12.0 6.1
01	7 30.3	7 31.5	7 09.7	0.1 0.1	6.1 3.1	12.1 6.2
02	7 30.5	7 31.7	7 10.0	0.2 0.1	6.2 3.2	12.2 6.2
03	7 30.8	7 32.0	7 10.2	0.3 0.2	6.3 3.2	12.3 6.3
04	7 31.0	7 32.2	7 10.5	0.4 0.2	6.4 3.3	12.4 6.3
05	7 31.3	7 32.5	7 10.7	0.5 0.3	6.5 3.3	12.5 6.4
06	7 31.5	7 32.7	7 10.9	0.6 0.3	6.6 3.4	12.6 6.4
07	7 31.8	7 33.0	7 11.2	0.7 0.4	6.7 3.4	12.7 6.5
08	7 32.0	7 33.2	7 11.4	0.8 0.4	6.8 3.5	12.8 6.5
09	7 32.3	7 33.5	7 11.6	0.9 0.5	6.9 3.5	12.9 6.6
10	7 32.5	7 33.7	7 11.9	1.0 0.5	7.0 3.6	13.0 6.6
11	7 32.8	7 34.0	7 12.1	1.1 0.6	7.1 3.6	13.1 6.7
12	7 33.0	7 34.2	7 12.4	1.2 0.6	7.2 3.7	13.2 6.7
13	7 33.3	7 34.5	7 12.6	1.3 0.7	7.3 3.7	13.3 6.8
14	7 33.5	7 34.7	7 12.8	1.4 0.7	7.4 3.8	13.4 6.8
15	7 33.8	7 35.0	7 13.1	1.5 0.8	7.5 3.8	13.5 6.9
16	7 34.0	7 35.2	7 13.3	1.6 0.8	7.6 3.9	13.6 6.9
17	7 34.3	7 35.5	7 13.6	1.7 0.9	7.7 3.9	13.7 7.0
18	7 34.5	7 35.7	7 13.8	1.8 0.9	7.8 4.0	13.8 7.0
19	7 34.8	7 36.0	7 14.0	1.9 1.0	7.9 4.0	13.9 7.1
20	7 35.0	7 36.2	7 14.3	2.0 1.0	8.0 4.1	14.0 7.1
21	7 35.3	7 36.5	7 14.5	2.1 1.1	8.1 4.1	14.1 7.2
22	7 35.5	7 36.7	7 14.7	2.2 1.1	8.2 4.2	14.2 7.2
23	7 35.8	7 37.0	7 15.0	2.3 1.2	8.3 4.2	14.3 7.3
24	7 36.0	7 37.2	7 15.2	2.4 1.2	8.4 4.3	14.4 7.3
25	7 36.3	7 37.5	7 15.5	2.5 1.3	8.5 4.3	14.5 7.4
26	7 36.5	7 37.7	7 15.7	2.6 1.3	8.6 4.4	14.6 7.4
27	7 36.8	7 38.0	7 15.9	2.7 1.4	8.7 4.4	14.7 7.5
28	7 37.0	7 38.3	7 16.2	2.8 1.4	8.8 4.5	14.8 7.5
29	7 37.3	7 38.5	7 16.4	2.9 1.5	8.9 4.5	14.9 7.6
30	7 37.5	7 38.8	7 16.7	3.0 1.5	9.0 4.6	15.0 7.6
31	7 37.8	7 39.0	7 16.9	3.1 1.6	9.1 4.6	15.1 7.7
32	7 38.0	7 39.3	7 17.1	3.2 1.6	9.2 4.7	15.2 7.7
33	7 38.3	7 39.5	7 17.4	3.3 1.7	9.3 4.7	15.3 7.8
34	7 38.5	7 39.8	7 17.6	3.4 1.7	9.4 4.8	15.4 7.8
35	7 38.8	7 40.0	7 17.9	3.5 1.8	9.5 4.8	15.5 7.9
36	7 39.0	7 40.3	7 18.1	3.6 1.8	9.6 4.9	15.6 7.9
37	7 39.3	7 40.5	7 18.3	3.7 1.9	9.7 4.9	15.7 8.0
38	7 39.5	7 40.8	7 18.6	3.8 1.9	9.8 5.0	15.8 8.0
39	7 39.8	7 41.0	7 18.8	3.9 2.0	9.9 5.0	15.9 8.1
40	7 40.0	7 41.3	7 19.0	4.0 2.0	10.0 5.1	16.0 8.1
41	7 40.3	7 41.5	7 19.3	4.1 2.1	10.1 5.1	16.1 8.2
42	7 40.5	7 41.8	7 19.5	4.2 2.1	10.2 5.2	16.2 8.2
43	7 40.8	7 42.0	7 19.8	4.3 2.2	10.3 5.2	16.3 8.3
44	7 41.0	7 42.3	7 20.0	4.4 2.2	10.4 5.3	16.4 8.3
45	7 41.3	7 42.5	7 20.2	4.5 2.3	10.5 5.3	16.5 8.4
46	7 41.5	7 42.8	7 20.5	4.6 2.3	10.6 5.4	16.6 8.4
47	7 41.8	7 43.0	7 20.7	4.7 2.4	10.7 5.4	16.7 8.5
48	7 42.0	7 43.3	7 21.0	4.8 2.4	10.8 5.5	16.8 8.5
49	7 42.3	7 43.5	7 21.2	4.9 2.5	10.9 5.5	16.9 8.6
50	7 42.5	7 43.8	7 21.4	5.0 2.5	11.0 5.6	17.0 8.6
51	7 42.8	7 44.0	7 21.7	5.1 2.6	11.1 5.6	17.1 8.7
52	7 43.0	7 44.3	7 21.9	5.2 2.6	11.2 5.7	17.2 8.7
53	7 43.3	7 44.5	7 22.1	5.3 2.7	11.3 5.7	17.3 8.8
54	7 43.5	7 44.8	7 22.4	5.4 2.7	11.4 5.8	17.4 8.8
55	7 43.8	7 45.0	7 22.6	5.5 2.8	11.5 5.8	17.5 8.9
56	7 44.0	7 45.3	7 22.9	5.6 2.8	11.6 5.9	17.6 8.9
57	7 44.3	7 45.5	7 23.1	5.7 2.9	11.7 5.9	17.7 9.0
58	7 44.5	7 45.8	7 23.3	5.8 2.9	11.8 6.0	17.8 9.0
59	7 44.8	7 46.0	7 23.6	5.9 3.0	11.9 6.0	17.9 9.1
60	7 45.0	7 46.3	7 23.8	6.0 3.1	12.0 6.1	18.0 9.2

^m 31	SUN PLANETS	ARIES	MOON	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$
s	o /	o /	o /	/ /	/ /	/ /
00	7 45.0	7 46.3	7 23.8	0.0 0.0	6.0 3.2	12.0 6.3
01	7 45.3	7 46.5	7 24.1	0.1 0.1	6.1 3.2	12.1 6.4
02	7 45.5	7 46.8	7 24.3	0.2 0.1	6.2 3.3	12.2 6.4
03	7 45.8	7 47.0	7 24.5	0.3 0.2	6.3 3.3	12.3 6.5
04	7 46.0	7 47.3	7 24.8	0.4 0.2	6.4 3.4	12.4 6.5
05	7 46.3	7 47.5	7 25.0	0.5 0.3	6.5 3.4	12.5 6.6
06	7 46.5	7 47.8	7 25.2	0.6 0.3	6.6 3.5	12.6 6.6
07	7 46.8	7 48.0	7 25.5	0.7 0.4	6.7 3.5	12.7 6.7
08	7 47.0	7 48.3	7 25.7	0.8 0.4	6.8 3.6	12.8 6.7
09	7 47.3	7 48.5	7 26.0	0.9 0.5	6.9 3.6	12.9 6.8
10	7 47.5	7 48.8	7 26.2	1.0 0.5	7.0 3.7	13.0 6.8
11	7 47.8	7 49.0	7 26.4	1.1 0.6	7.1 3.7	13.1 6.9
12	7 48.0	7 49.3	7 26.7	1.2 0.6	7.2 3.8	13.2 6.9
13	7 48.3	7 49.5	7 26.9	1.3 0.7	7.3 3.8	13.3 7.0
14	7 48.5	7 49.8	7 27.2	1.4 0.7	7.4 3.9	13.4 7.0
15	7 48.8	7 50.0	7 27.4	1.5 0.8	7.5 3.9	13.5 7.1
16	7 49.0	7 50.3	7 27.6	1.6 0.8	7.6 4.0	13.6 7.1
17	7 49.3	7 50.5	7 27.9	1.7 0.9	7.7 4.0	13.7 7.2
18	7 49.5	7 50.8	7 28.1	1.8 0.9	7.8 4.1	13.8 7.2
19	7 49.8	7 51.0	7 28.4	1.9 1.0	7.9 4.1	13.9 7.3
20	7 50.0	7 51.3	7 28.6	2.0 1.1	8.0 4.2	14.0 7.4
21	7 50.3	7 51.5	7 28.8	2.1 1.1	8.1 4.3	14.1 7.4
22	7 50.5	7 51.8	7 29.1	2.2 1.2	8.2 4.3	14.2 7.5
23	7 50.8	7 52.0	7 29.3	2.3 1.2	8.3 4.4	14.3 7.5
24	7 51.0	7 52.3	7 29.5	2.4 1.3	8.4 4.4	14.4 7.6
25	7 51.3	7 52.5	7 29.8	2.5 1.3	8.5 4.5	14.5 7.6
26	7 51.5	7 52.8	7 30.0	2.6 1.4	8.6 4.5	14.6 7.7
27	7 51.8	7 53.0	7 30.3	2.7 1.4	8.7 4.6	14.7 7.7
28	7 52.0	7 53.3	7 30.5	2.8 1.5	8.8 4.6	14.8 7.8
29	7 52.3	7 53.5	7 30.7	2.9 1.5	8.9 4.7	14.9 7.8
30	7 52.5	7 53.8	7 31.0	3.0 1.6	9.0 4.7	15.0 7.9
31	7 52.8	7 54.0	7 31.2	3.1 1.6	9.1 4.8	15.1 7.9
32	7 53.0	7 54.3	7 31.5	3.2 1.7	9.2 4.8	15.2 8.0
33	7 53.3	7 54.5	7 31.7	3.3 1.7	9.3 4.9	15.3 8.0
34	7 53.5	7 54.8	7 31.9	3.4 1.8	9.4 4.9	15.4 8.1
35	7 53.8	7 55.0	7 32.2	3.5 1.8	9.5 5.0	15.5 8.1
36	7 54.0	7 55.3	7 32.4	3.6 1.9	9.6 5.0	15.6 8.2
37	7 54.3	7 55.5	7 32.6	3.7 1.9	9.7 5.1	15.7 8.2
38	7 54.5	7 55.8	7 32.9	3.8 2.0	9.8 5.1	15.8 8.3
39	7 54.8	7 56.0	7 33.1	3.9 2.0	9.9 5.2	15.9 8.3
40	7 55.0	7 56.3	7 33.4	4.0 2.1	10.0 5.3	16.0 8.4
41	7 55.3	7 56.6	7 33.6	4.1 2.2	10.1 5.3	16.1 8.5
42	7 55.5	7 56.8	7 33.8	4.2 2.2	10.2 5.4	16.2 8.5
43	7 55.8	7 57.1	7 34.1	4.3 2.3	10.3 5.4	16.3 8.6
44	7 56.0	7 57.3	7 34.3	4.4 2.3	10.4 5.5	16.4 8.6
45	7 56.3	7 57.6	7 34.6	4.5 2.4	10.5 5.5	16.5 8.7
46	7 56.5	7 57.8	7 34.8	4.6 2.4	10.6 5.6	16.6 8.7
47	7 56.8	7 58.1	7 35.0	4.7 2.5	10.7 5.6	16.7 8.8
48	7 57.0	7 58.3	7 35.3	4.8 2.5	10.8 5.7	16.8 8.8
49	7 57.3	7 58.6	7 35.5	4.9 2.6	10.9 5.7	16.9 8.9
50	7 57.5	7 58.8	7 35.7	5.0 2.6	11.0 5.8	17.0 8.9
51	7 57.8	7 59.1	7 36.0	5.1 2.7	11.1 5.8	17.1 9.0
52	7 58.0	7 59.3	7 36.2	5.2 2.7	11.2 5.9	17.2 9.0
53	7 58.3	7 59.6	7 36.5	5.3 2.8	11.3 5.9	17.3 9.1
54	7 58.5	7 59.8	7 36.7	5.4 2.8	11.4 6.0	17.4 9.1
55	7 58.8	8 00.1	7 36.9	5.5 2.9	11.5 6.0	17.5 9.2
56	7 59.0	8 00.3	7 37.2	5.6 2.9	11.6 6.1	17.6 9.2
57	7 59.3	8 00.6	7 37.4	5.7 3.0	11.7 6.1	17.7 9.3
58	7 59.5	8 00.8	7 37.7	5.8 3.0	11.8 6.2	17.8 9.3
59	7 59.8	8 01.1	7 37.9	5.9 3.1	11.9 6.2	17.9 9.4
60	8 00.0	8 01.3	7 38.1	6.0 3.2	12.0 6.3	18.0 9.5

^m 32	SUN PLANETS	ARIES	MOON	^h or d	Corr ⁿ	^h or d	Corr ⁿ	^h or d	Corr ⁿ
s	o	/	o	/	/	/	/	/	/
00	8 00-0	8 01-3	7 38-1	0-0	0-0	6-0	3-3	12-0	6-5
01	8 00-3	8 01-6	7 38-4	0-1	0-1	6-1	3-3	12-1	6-6
02	8 00-5	8 01-8	7 38-6	0-2	0-1	6-2	3-4	12-2	6-6
03	8 00-8	8 02-1	7 38-8	0-3	0-2	6-3	3-4	12-3	6-7
04	8 01-0	8 02-3	7 39-1	0-4	0-2	6-4	3-5	12-4	6-7
05	8 01-3	8 02-6	7 39-3	0-5	0-3	6-5	3-5	12-5	6-8
06	8 01-5	8 02-8	7 39-6	0-6	0-3	6-6	3-6	12-6	6-8
07	8 01-8	8 03-1	7 39-8	0-7	0-4	6-7	3-6	12-7	6-9
08	8 02-0	8 03-3	7 40-0	0-8	0-4	6-8	3-7	12-8	6-9
09	8 02-3	8 03-6	7 40-3	0-9	0-5	6-9	3-7	12-9	7-0
10	8 02-5	8 03-8	7 40-5	1-0	0-5	7-0	3-8	13-0	7-0
11	8 02-8	8 04-1	7 40-8	1-1	0-6	7-1	3-8	13-1	7-1
12	8 03-0	8 04-3	7 41-0	1-2	0-7	7-2	3-9	13-2	7-2
13	8 03-3	8 04-6	7 41-2	1-3	0-7	7-3	4-0	13-3	7-2
14	8 03-5	8 04-8	7 41-5	1-4	0-8	7-4	4-0	13-4	7-3
15	8 03-8	8 05-1	7 41-7	1-5	0-8	7-5	4-1	13-5	7-3
16	8 04-0	8 05-3	7 42-0	1-6	0-9	7-6	4-1	13-6	7-4
17	8 04-3	8 05-6	7 42-2	1-7	0-9	7-7	4-2	13-7	7-4
18	8 04-5	8 05-8	7 42-4	1-8	1-0	7-8	4-2	13-8	7-5
19	8 04-8	8 06-1	7 42-7	1-9	1-0	7-9	4-3	13-9	7-5
20	8 05-0	8 06-3	7 42-9	2-0	1-1	8-0	4-3	14-0	7-6
21	8 05-3	8 06-6	7 43-1	2-1	1-1	8-1	4-4	14-1	7-6
22	8 05-5	8 06-8	7 43-4	2-2	1-2	8-2	4-4	14-2	7-7
23	8 05-8	8 07-1	7 43-6	2-3	1-2	8-3	4-5	14-3	7-7
24	8 06-0	8 07-3	7 43-9	2-4	1-3	8-4	4-6	14-4	7-8
25	8 06-3	8 07-6	7 44-1	2-5	1-4	8-5	4-6	14-5	7-9
26	8 06-5	8 07-8	7 44-3	2-6	1-4	8-6	4-7	14-6	7-9
27	8 06-8	8 08-1	7 44-6	2-7	1-5	8-7	4-7	14-7	8-0
28	8 07-0	8 08-3	7 44-8	2-8	1-5	8-8	4-8	14-8	8-0
29	8 07-3	8 08-6	7 45-1	2-9	1-6	8-9	4-8	14-9	8-1
30	8 07-5	8 08-8	7 45-3	3-0	1-6	9-0	4-9	15-0	8-1
31	8 07-8	8 09-1	7 45-5	3-1	1-7	9-1	4-9	15-1	8-2
32	8 08-0	8 09-3	7 45-8	3-2	1-7	9-2	5-0	15-2	8-2
33	8 08-3	8 09-6	7 46-0	3-3	1-8	9-3	5-0	15-3	8-3
34	8 08-5	8 09-8	7 46-2	3-4	1-8	9-4	5-1	15-4	8-3
35	8 08-8	8 10-1	7 46-5	3-5	1-9	9-5	5-1	15-5	8-4
36	8 09-0	8 10-3	7 46-7	3-6	2-0	9-6	5-2	15-6	8-5
37	8 09-3	8 10-6	7 47-0	3-7	2-0	9-7	5-3	15-7	8-5
38	8 09-5	8 10-8	7 47-2	3-8	2-1	9-8	5-3	15-8	8-6
39	8 09-8	8 11-1	7 47-4	3-9	2-1	9-9	5-4	15-9	8-6
40	8 10-0	8 11-3	7 47-7	4-0	2-2	10-0	5-4	16-0	8-7
41	8 10-3	8 11-6	7 47-9	4-1	2-2	10-1	5-5	16-1	8-7
42	8 10-5	8 11-8	7 48-2	4-2	2-3	10-2	5-5	16-2	8-8
43	8 10-8	8 12-1	7 48-4	4-3	2-3	10-3	5-6	16-3	8-8
44	8 11-0	8 12-3	7 48-6	4-4	2-4	10-4	5-6	16-4	8-9
45	8 11-3	8 12-6	7 48-9	4-5	2-4	10-5	5-7	16-5	8-9
46	8 11-5	8 12-8	7 49-1	4-6	2-5	10-6	5-7	16-6	9-0
47	8 11-8	8 13-1	7 49-3	4-7	2-5	10-7	5-8	16-7	9-0
48	8 12-0	8 13-3	7 49-6	4-8	2-6	10-8	5-9	16-8	9-1
49	8 12-3	8 13-6	7 49-8	4-9	2-7	10-9	5-9	16-9	9-2
50	8 12-5	8 13-8	7 50-1	5-0	2-7	11-0	6-0	17-0	9-2
51	8 12-8	8 14-1	7 50-3	5-1	2-8	11-1	6-0	17-1	9-3
52	8 13-0	8 14-3	7 50-5	5-2	2-8	11-2	6-1	17-2	9-3
53	8 13-3	8 14-6	7 50-8	5-3	2-9	11-3	6-1	17-3	9-4
54	8 13-5	8 14-9	7 51-0	5-4	2-9	11-4	6-2	17-4	9-4
55	8 13-8	8 15-1	7 51-3	5-5	3-0	11-5	6-2	17-5	9-5
56	8 14-0	8 15-4	7 51-5	5-6	3-0	11-6	6-3	17-6	9-5
57	8 14-3	8 15-6	7 51-7	5-7	3-1	11-7	6-3	17-7	9-6
58	8 14-5	8 15-9	7 52-0	5-8	3-1	11-8	6-4	17-8	9-6
59	8 14-8	8 16-1	7 52-2	5-9	3-2	11-9	6-4	17-9	9-7
60	8 15-0	8 16-4	7 52-5	6-0	3-3	12-0	6-5	18-0	9-8

^m 33	SUN PLANETS	ARIES	MOON	^h or d	Corr ⁿ	^h or d	Corr ⁿ	^h or d	Corr ⁿ
s	o	/	o	/	/	/	/	/	/
00	8 15-0	8 16-4	7 52-5	0-0	0-0	6-0	3-4	12-0	6-7
01	8 15-3	8 16-6	7 52-7	0-1	0-1	6-1	3-4	12-1	6-8
02	8 15-5	8 16-9	7 52-9	0-2	0-1	6-2	3-5	12-2	6-8
03	8 15-8	8 17-1	7 53-2	0-3	0-2	6-3	3-5	12-3	6-9
04	8 16-0	8 17-4	7 53-4	0-4	0-2	6-4	3-6	12-4	6-9
05	8 16-3	8 17-6	7 53-6	0-5	0-3	6-5	3-6	12-5	7-0
06	8 16-5	8 17-9	7 53-9	0-6	0-3	6-6	3-7	12-6	7-0
07	8 16-8	8 18-1	7 54-1	0-7	0-4	6-7	3-7	12-7	7-1
08	8 17-0	8 18-4	7 54-4	0-8	0-4	6-8	3-8	12-8	7-1
09	8 17-3	8 18-6	7 54-6	0-9	0-5	6-9	3-9	12-9	7-2
10	8 17-5	8 18-9	7 54-8	1-0	0-6	7-0	3-9	13-0	7-3
11	8 17-8	8 19-1	7 55-1	1-1	0-6	7-1	4-0	13-1	7-3
12	8 18-0	8 19-4	7 55-3	1-2	0-7	7-2	4-0	13-2	7-4
13	8 18-3	8 19-6	7 55-6	1-3	0-7	7-3	4-1	13-3	7-4
14	8 18-5	8 19-9	7 55-8	1-4	0-8	7-4	4-1	13-4	7-5
15	8 18-8	8 20-1	7 56-0	1-5	0-8	7-5	4-2	13-5	7-5
16	8 19-0	8 20-4	7 56-3	1-6	0-9	7-6	4-2	13-6	7-6
17	8 19-3	8 20-6	7 56-5	1-7	0-9	7-7	4-3	13-7	7-6
18	8 19-5	8 20-9	7 56-7	1-8	1-0	7-8	4-4	13-8	7-7
19	8 19-8	8 21-1	7 57-0	1-9	1-1	7-9	4-4	13-9	7-8
20	8 20-0	8 21-4	7 57-2	2-0	1-1	8-0	4-5	14-0	7-8
21	8 20-3	8 21-6	7 57-5	2-1	1-2	8-1	4-5	14-1	7-9
22	8 20-5	8 21-9	7 57-7	2-2	1-2	8-2	4-6	14-2	7-9
23	8 20-8	8 22-1	7 57-9	2-3	1-3	8-3	4-6	14-3	8-0
24	8 21-0	8 22-4	7 58-2	2-4	1-3	8-4	4-7	14-4	8-0
25	8 21-3	8 22-6	7 58-4	2-5	1-4	8-5	4-7	14-5	8-1
26	8 21-5	8 22-9	7 58-7	2-6	1-5	8-6	4-8	14-6	8-2
27	8 21-8	8 23-1	7 58-9	2-7	1-5	8-7	4-9	14-7	8-2
28	8 22-0	8 23-4	7 59-1	2-8	1-6	8-8	4-9	14-8	8-3
29	8 22-3	8 23-6	7 59-4	2-9	1-6	8-9	5-0	14-9	8-3
30	8 22-5	8 23-9	7 59-6	3-0	1-7	9-0	5-0	15-0	8-4
31	8 22-8	8 24-1	7 59-8	3-1	1-7	9-1	5-1	15-1	8-4
32	8 23-0	8 24-4	8 00-1	3-2	1-8	9-2	5-1	15-2	8-5
33	8 23-3	8 24-6	8 00-3	3-3	1-8	9-3	5-2	15-3	8-5
34	8 23-5	8 24-9	8 00-6	3-4	1-9	9-4	5-2	15-4	8-6
35	8 23-8	8 25-1	8 00-8	3-5	2-0	9-5	5-3	15-5	8-7
36	8 24-0	8 25-4	8 01-0	3-6	2-0	9-6	5-4	15-6	8-7
37	8 24-3	8 25-6	8 01-3	3-7	2-1	9-7	5-4	15-7	8-8
38	8 24-5	8 25-9	8 01-5	3-8	2-1	9-8	5-5	15-8	8-8
39	8 24-8	8 26-1	8 01-8	3-9	2-2	9-9	5-5	15-9	8-9
40	8 25-0	8 26-4	8 02-0	4-0	2-2	10-0	5-6	16-0	8-9
41	8 25-3	8 26-6	8 02-2	4-1	2-3	10-1	5-6	16-1	9-0
42	8 25-5	8 26-9	8 02-5	4-2	2-3	10-2	5-7	16-2	9-0
43	8 25-8	8 27-1	8 02-7	4-3	2-4	10-3	5-8	16-3	9-1
44	8 26-0	8 27-4	8 02-9	4-4	2-5	10-4	5-8	16-4	9-2
45	8 26-3	8 27-6	8 03-2	4-5	2-5	10-5	5-9	16-5	9-2
46	8 26-5	8 27-9	8 03-4	4-6	2-6	10-6	5-9	16-6	9-3
47	8 26-8	8 28-1	8 03-7	4-7	2-6	10-7	6-0	16-7	9-3
48	8 27-0	8 28-4	8 03-9	4-8	2-7	10-8	6-0	16-8	9-4
49	8 27-3	8 28-6	8 04-1	4-9	2-7	10-9	6-1	16-9	9-4
50	8 27-5	8 28-9	8 04-4	5-0	2-8	11-0	6-1	17-0	9-5
51	8 27-8	8 29-1	8 04-6	5-1	2-8	11-1	6-2	17-1	9-5
52	8 28-0	8 29-4	8 04-9	5-2	2-9	11-2	6-3	17-2	9-6
53	8 28-3	8 29-6	8 05-1	5-3	3-0	11-3	6-3	17-3	9-7
54	8 28-5	8 29-9	8 05-3	5-4	3-0	11-4	6-4	17-4	9-7
55	8 28-8	8 30-1	8 05-6	5-5	3-1	11-5	6-4	17-5	9-8
56	8 29-0	8 30-4	8 05-8	5-6	3-1	11-6	6-5	17-6	9-8
57	8 29-3	8 30-6	8 06-1	5-7	3-2	11-7	6-5	17-7	9-9
58	8 29-5	8 30-9	8 06-3	5-8	3-2	11-8	6-6	17-8	9-9
59	8 29-8	8 31-1	8 06-5	5-9	3-3	11-9	6-6	17-9	10-0
60	8 30-0	8 31-4	8 06-8	6-0	3-4	12-0	6-7	18-0	10-1

^m 34	SUN PLANETS	ARIES	MOON	<i>v</i> or <i>d</i>	Corr ⁿ	<i>v</i> or <i>d</i>	Corr ⁿ	<i>v</i> or <i>d</i>	Corr ⁿ
<i>s</i>	<i>o</i> / <i>i</i>	<i>o</i> / <i>i</i>	<i>o</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>
00	8 30.0	8 31.4	8 06.8	0.0	0.0	6.0	3.5	12.0	6.9
01	8 30.3	8 31.6	8 07.0	0.1	0.1	6.1	3.5	12.1	7.0
02	8 30.5	8 31.9	8 07.2	0.2	0.1	6.2	3.6	12.2	7.0
03	8 30.8	8 32.1	8 07.5	0.3	0.2	6.3	3.6	12.3	7.1
04	8 31.0	8 32.4	8 07.7	0.4	0.2	6.4	3.7	12.4	7.1
05	8 31.3	8 32.6	8 08.0	0.5	0.3	6.5	3.7	12.5	7.2
06	8 31.5	8 32.9	8 08.2	0.6	0.3	6.6	3.8	12.6	7.2
07	8 31.8	8 33.2	8 08.4	0.7	0.4	6.7	3.9	12.7	7.3
08	8 32.0	8 33.4	8 08.7	0.8	0.5	6.8	3.9	12.8	7.4
09	8 32.3	8 33.7	8 08.9	0.9	0.5	6.9	4.0	12.9	7.4
10	8 32.5	8 33.9	8 09.2	1.0	0.6	7.0	4.0	13.0	7.5
11	8 32.8	8 34.2	8 09.4	1.1	0.6	7.1	4.1	13.1	7.5
12	8 33.0	8 34.4	8 09.6	1.2	0.7	7.2	4.1	13.2	7.6
13	8 33.3	8 34.7	8 09.9	1.3	0.7	7.3	4.2	13.3	7.6
14	8 33.5	8 34.9	8 10.1	1.4	0.8	7.4	4.3	13.4	7.7
15	8 33.8	8 35.2	8 10.3	1.5	0.9	7.5	4.3	13.5	7.8
16	8 34.0	8 35.4	8 10.6	1.6	0.9	7.6	4.4	13.6	7.8
17	8 34.3	8 35.7	8 10.8	1.7	1.0	7.7	4.4	13.7	7.9
18	8 34.5	8 35.9	8 11.1	1.8	1.0	7.8	4.5	13.8	7.9
19	8 34.8	8 36.2	8 11.3	1.9	1.1	7.9	4.5	13.9	8.0
20	8 35.0	8 36.4	8 11.5	2.0	1.2	8.0	4.6	14.0	8.1
21	8 35.3	8 36.7	8 11.8	2.1	1.2	8.1	4.7	14.1	8.1
22	8 35.5	8 36.9	8 12.0	2.2	1.3	8.2	4.7	14.2	8.2
23	8 35.8	8 37.2	8 12.3	2.3	1.3	8.3	4.8	14.3	8.2
24	8 36.0	8 37.4	8 12.5	2.4	1.4	8.4	4.8	14.4	8.3
25	8 36.3	8 37.7	8 12.7	2.5	1.4	8.5	4.9	14.5	8.3
26	8 36.5	8 37.9	8 13.0	2.6	1.5	8.6	4.9	14.6	8.4
27	8 36.8	8 38.2	8 13.2	2.7	1.6	8.7	5.0	14.7	8.5
28	8 37.0	8 38.4	8 13.4	2.8	1.6	8.8	5.1	14.8	8.5
29	8 37.3	8 38.7	8 13.7	2.9	1.7	8.9	5.1	14.9	8.6
30	8 37.5	8 38.9	8 13.9	3.0	1.7	9.0	5.2	15.0	8.6
31	8 37.8	8 39.2	8 14.2	3.1	1.8	9.1	5.2	15.1	8.7
32	8 38.0	8 39.4	8 14.4	3.2	1.8	9.2	5.3	15.2	8.7
33	8 38.3	8 39.7	8 14.6	3.3	1.9	9.3	5.3	15.3	8.8
34	8 38.5	8 39.9	8 14.9	3.4	2.0	9.4	5.4	15.4	8.9
35	8 38.8	8 40.2	8 15.1	3.5	2.0	9.5	5.5	15.5	8.9
36	8 39.0	8 40.4	8 15.4	3.6	2.1	9.6	5.5	15.6	9.0
37	8 39.3	8 40.7	8 15.6	3.7	2.1	9.7	5.6	15.7	9.0
38	8 39.5	8 40.9	8 15.8	3.8	2.2	9.8	5.6	15.8	9.1
39	8 39.8	8 41.2	8 16.1	3.9	2.2	9.9	5.7	15.9	9.1
40	8 40.0	8 41.4	8 16.3	4.0	2.3	10.0	5.8	16.0	9.2
41	8 40.3	8 41.7	8 16.5	4.1	2.4	10.1	5.8	16.1	9.3
42	8 40.5	8 41.9	8 16.8	4.2	2.4	10.2	5.9	16.2	9.3
43	8 40.8	8 42.2	8 17.0	4.3	2.5	10.3	5.9	16.3	9.4
44	8 41.0	8 42.4	8 17.3	4.4	2.5	10.4	6.0	16.4	9.4
45	8 41.3	8 42.7	8 17.5	4.5	2.6	10.5	6.0	16.5	9.5
46	8 41.5	8 42.9	8 17.7	4.6	2.6	10.6	6.1	16.6	9.5
47	8 41.8	8 43.2	8 18.0	4.7	2.7	10.7	6.2	16.7	9.6
48	8 42.0	8 43.4	8 18.2	4.8	2.8	10.8	6.2	16.8	9.7
49	8 42.3	8 43.7	8 18.5	4.9	2.8	10.9	6.3	16.9	9.7
50	8 42.5	8 43.9	8 18.7	5.0	2.9	11.0	6.3	17.0	9.8
51	8 42.8	8 44.2	8 18.9	5.1	2.9	11.1	6.4	17.1	9.8
52	8 43.0	8 44.4	8 19.2	5.2	3.0	11.2	6.4	17.2	9.9
53	8 43.3	8 44.7	8 19.4	5.3	3.0	11.3	6.5	17.3	9.9
54	8 43.5	8 44.9	8 19.7	5.4	3.1	11.4	6.6	17.4	10.0
55	8 43.8	8 45.2	8 19.9	5.5	3.2	11.5	6.6	17.5	10.1
56	8 44.0	8 45.4	8 20.1	5.6	3.2	11.6	6.7	17.6	10.1
57	8 44.3	8 45.7	8 20.4	5.7	3.3	11.7	6.7	17.7	10.2
58	8 44.5	8 45.9	8 20.6	5.8	3.3	11.8	6.8	17.8	10.2
59	8 44.8	8 46.2	8 20.8	5.9	3.4	11.9	6.8	17.9	10.3
60	8 45.0	8 46.4	8 21.1	6.0	3.5	12.0	6.9	18.0	10.4

^m 35	SUN PLANETS	ARIES	MOON	<i>v</i> or <i>d</i>	Corr ⁿ	<i>v</i> or <i>d</i>	Corr ⁿ	<i>v</i> or <i>d</i>	Corr ⁿ
<i>s</i>	<i>o</i> / <i>i</i>	<i>o</i> / <i>i</i>	<i>o</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>	<i>i</i> / <i>i</i>
00	8 45.0	8 46.4	8 21.1	0.0	0.0	6.0	3.6	12.0	7.1
01	8 45.3	8 46.7	8 21.3	0.1	0.1	6.1	3.6	12.1	7.2
02	8 45.5	8 46.9	8 21.6	0.2	0.1	6.2	3.7	12.2	7.2
03	8 45.8	8 47.2	8 21.8	0.3	0.2	6.3	3.7	12.3	7.3
04	8 46.0	8 47.4	8 22.0	0.4	0.2	6.4	3.8	12.4	7.3
05	8 46.3	8 47.7	8 22.3	0.5	0.3	6.5	3.8	12.5	7.4
06	8 46.5	8 47.9	8 22.5	0.6	0.4	6.6	3.9	12.6	7.5
07	8 46.8	8 48.2	8 22.8	0.7	0.4	6.7	4.0	12.7	7.5
08	8 47.0	8 48.4	8 23.0	0.8	0.5	6.8	4.0	12.8	7.6
09	8 47.3	8 48.7	8 23.2	0.9	0.5	6.9	4.1	12.9	7.6
10	8 47.5	8 48.9	8 23.5	1.0	0.6	7.0	4.1	13.0	7.7
11	8 47.8	8 49.2	8 23.7	1.1	0.7	7.1	4.2	13.1	7.8
12	8 48.0	8 49.4	8 23.9	1.2	0.7	7.2	4.3	13.2	7.8
13	8 48.3	8 49.7	8 24.2	1.3	0.8	7.3	4.3	13.3	7.9
14	8 48.5	8 49.9	8 24.4	1.4	0.8	7.4	4.4	13.4	7.9
15	8 48.8	8 50.2	8 24.7	1.5	0.9	7.5	4.4	13.5	8.0
16	8 49.0	8 50.4	8 24.9	1.6	0.9	7.6	4.5	13.6	8.0
17	8 49.3	8 50.7	8 25.1	1.7	1.0	7.7	4.6	13.7	8.1
18	8 49.5	8 50.9	8 25.4	1.8	1.1	7.8	4.6	13.8	8.2
19	8 49.8	8 51.2	8 25.6	1.9	1.1	7.9	4.7	13.9	8.2
20	8 50.0	8 51.5	8 25.9	2.0	1.2	8.0	4.7	14.0	8.3
21	8 50.3	8 51.7	8 26.1	2.1	1.2	8.1	4.8	14.1	8.3
22	8 50.5	8 52.0	8 26.3	2.2	1.3	8.2	4.9	14.2	8.4
23	8 50.8	8 52.2	8 26.6	2.3	1.4	8.3	4.9	14.3	8.5
24	8 51.0	8 52.5	8 26.8	2.4	1.4	8.4	5.0	14.4	8.5
25	8 51.3	8 52.7	8 27.0	2.5	1.5	8.5	5.0	14.5	8.6
26	8 51.5	8 53.0	8 27.3	2.6	1.5	8.6	5.1	14.6	8.6
27	8 51.8	8 53.2	8 27.5	2.7	1.6	8.7	5.1	14.7	8.7
28	8 52.0	8 53.5	8 27.8	2.8	1.7	8.8	5.2	14.8	8.8
29	8 52.3	8 53.7	8 28.0	2.9	1.7	8.9	5.3	14.9	8.8
30	8 52.5	8 54.0	8 28.2	3.0	1.8	9.0	5.3	15.0	8.9
31	8 52.8	8 54.2	8 28.5	3.1	1.8	9.1	5.4	15.1	8.9
32	8 53.0	8 54.5	8 28.7	3.2	1.9	9.2	5.4	15.2	9.0
33	8 53.3	8 54.7	8 29.0	3.3	2.0	9.3	5.5	15.3	9.1
34	8 53.5	8 55.0	8 29.2	3.4	2.0	9.4	5.6	15.4	9.1
35	8 53.8	8 55.2	8 29.4	3.5	2.1	9.5	5.6	15.5	9.2
36	8 54.0	8 55.5	8 29.7	3.6	2.1	9.6	5.7	15.6	9.2
37	8 54.3	8 55.7	8 29.9	3.7	2.2	9.7	5.7	15.7	9.3
38	8 54.5	8 56.0	8 30.2	3.8	2.2	9.8	5.8	15.8	9.3
39	8 54.8	8 56.2	8 30.4	3.9	2.3	9.9	5.9	15.9	9.4
40	8 55.0	8 56.5	8 30.6	4.0	2.4	10.0	5.9	16.0	9.5
41	8 55.3	8 56.7	8 30.9	4.1	2.4	10.1	6.0	16.1	9.5
42	8 55.5	8 57.0	8 31.1	4.2	2.5	10.2	6.0	16.2	9.6
43	8 55.8	8 57.2	8 31.3	4.3	2.5	10.3	6.1	16.3	9.6
44	8 56.0	8 57.5	8 31.6	4.4	2.6	10.4	6.2	16.4	9.7
45	8 56.3	8 57.7	8 31.8	4.5	2.7	10.5	6.2	16.5	9.8
46	8 56.5	8 58.0	8 32.1	4.6	2.7	10.6	6.3	16.6	9.8
47	8 56.8	8 58.2	8 32.3	4.7	2.8	10.7	6.3	16.7	9.9
48	8 57.0	8 58.5	8 32.5	4.8	2.8	10.8	6.4	16.8	9.9
49	8 57.3	8 58.7	8 32.8	4.9	2.9	10.9	6.4	16.9	10.0
50	8 57.5	8 59.0	8 33.0	5.0	3.0	11.0	6.5	17.0	10.1
51	8 57.8	8 59.2	8 33.3	5.1	3.0	11.1	6.6	17.1	10.1
52	8 58.0	8 59.5	8 33.5	5.2	3.1	11.2	6.6	17.2	10.2
53	8 58.3	8 59.7	8 33.7	5.3	3.1	11.3	6.7	17.3	10.2
54	8 58.5	9 00.0	8 34.0	5.4	3.2	11.4	6.7	17.4	10.3
55	8 58.8	9 00.2	8 34.2	5.5	3.3	11.5	6.8	17.5	10.4
56	8 59.0	9 00.5	8 34.4	5.6	3.3	11.6	6.9	17.6	10.4
57	8 59.3	9 00.7	8 34.7	5.7	3.4	11.7	6.9	17.7	10.5
58	8 59.5	9 01.0	8 34.9	5.8	3.4	11.8	7.0	17.8	10.5
59	8 59.8	9 01.2	8 35.2	5.9	3.5	11.9	7.0	17.9	10.6
60	9 00.0	9 01.5	8 35.4	6.0	3.6	12.0	7.1	18.0	10.7

36 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	37 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	o	i	o	i	i	i	s	o	i	o	i	i	i
00	9 00.0	9 01.5	8 35.4	0.0	0.0	6.0	00	9 15.0	9 16.5	8 49.7	0.0	0.0	6.0
01	9 00.3	9 01.7	8 35.6	0.1	0.1	6.1	01	9 15.3	9 16.8	8 50.0	0.1	0.1	6.1
02	9 00.5	9 02.0	8 35.9	0.2	0.1	6.2	02	9 15.5	9 17.0	8 50.2	0.2	0.1	6.2
03	9 00.8	9 02.2	8 36.1	0.3	0.2	6.3	03	9 15.8	9 17.3	8 50.4	0.3	0.2	6.3
04	9 01.0	9 02.5	8 36.4	0.4	0.2	6.4	04	9 16.0	9 17.5	8 50.7	0.4	0.3	6.4
05	9 01.3	9 02.7	8 36.6	0.5	0.3	6.5	05	9 16.3	9 17.8	8 50.9	0.5	0.3	6.5
06	9 01.5	9 03.0	8 36.8	0.6	0.4	6.6	06	9 16.5	9 18.0	8 51.1	0.6	0.4	6.6
07	9 01.8	9 03.2	8 37.1	0.7	0.4	6.7	07	9 16.8	9 18.3	8 51.4	0.7	0.4	6.7
08	9 02.0	9 03.5	8 37.3	0.8	0.5	6.8	08	9 17.0	9 18.5	8 51.6	0.8	0.5	6.8
09	9 02.3	9 03.7	8 37.5	0.9	0.5	6.9	09	9 17.3	9 18.8	8 51.9	0.9	0.6	6.9
10	9 02.5	9 04.0	8 37.8	1.0	0.6	7.0	10	9 17.5	9 19.0	8 52.1	1.0	0.6	7.0
11	9 02.8	9 04.2	8 38.0	1.1	0.7	7.1	11	9 17.8	9 19.3	8 52.3	1.1	0.7	7.1
12	9 03.0	9 04.5	8 38.3	1.2	0.7	7.2	12	9 18.0	9 19.5	8 52.6	1.2	0.8	7.2
13	9 03.3	9 04.7	8 38.5	1.3	0.8	7.3	13	9 18.3	9 19.8	8 52.8	1.3	0.8	7.3
14	9 03.5	9 05.0	8 38.7	1.4	0.9	7.4	14	9 18.5	9 20.0	8 53.1	1.4	0.9	7.4
15	9 03.8	9 05.2	8 39.0	1.5	0.9	7.5	15	9 18.8	9 20.3	8 53.3	1.5	0.9	7.5
16	9 04.0	9 05.5	8 39.2	1.6	1.0	7.6	16	9 19.0	9 20.5	8 53.5	1.6	1.0	7.6
17	9 04.3	9 05.7	8 39.5	1.7	1.0	7.7	17	9 19.3	9 20.8	8 53.8	1.7	1.1	7.7
18	9 04.5	9 06.0	8 39.7	1.8	1.1	7.8	18	9 19.5	9 21.0	8 54.0	1.8	1.1	7.8
19	9 04.8	9 06.2	8 39.9	1.9	1.2	7.9	19	9 19.8	9 21.3	8 54.3	1.9	1.2	7.9
20	9 05.0	9 06.5	8 40.2	2.0	1.2	8.0	20	9 20.0	9 21.5	8 54.5	2.0	1.3	8.0
21	9 05.3	9 06.7	8 40.4	2.1	1.3	8.1	21	9 20.3	9 21.8	8 54.7	2.1	1.3	8.1
22	9 05.5	9 07.0	8 40.6	2.2	1.3	8.2	22	9 20.5	9 22.0	8 55.0	2.2	1.4	8.2
23	9 05.8	9 07.2	8 40.9	2.3	1.4	8.3	23	9 20.8	9 22.3	8 55.2	2.3	1.4	8.3
24	9 06.0	9 07.5	8 41.1	2.4	1.5	8.4	24	9 21.0	9 22.5	8 55.4	2.4	1.5	8.4
25	9 06.3	9 07.7	8 41.4	2.5	1.5	8.5	25	9 21.3	9 22.8	8 55.7	2.5	1.6	8.5
26	9 06.5	9 08.0	8 41.6	2.6	1.6	8.6	26	9 21.5	9 23.0	8 55.9	2.6	1.6	8.6
27	9 06.8	9 08.2	8 41.8	2.7	1.6	8.7	27	9 21.8	9 23.3	8 56.2	2.7	1.7	8.7
28	9 07.0	9 08.5	8 42.1	2.8	1.7	8.8	28	9 22.0	9 23.5	8 56.4	2.8	1.8	8.8
29	9 07.3	9 08.7	8 42.3	2.9	1.8	8.9	29	9 22.3	9 23.8	8 56.6	2.9	1.8	8.9
30	9 07.5	9 09.0	8 42.6	3.0	1.8	9.0	30	9 22.5	9 24.0	8 56.9	3.0	1.9	9.0
31	9 07.8	9 09.2	8 42.8	3.1	1.9	9.1	31	9 22.8	9 24.3	8 57.1	3.1	1.9	9.1
32	9 08.0	9 09.5	8 43.0	3.2	1.9	9.2	32	9 23.0	9 24.5	8 57.4	3.2	2.0	9.2
33	9 08.3	9 09.8	8 43.3	3.3	2.0	9.3	33	9 23.3	9 24.8	8 57.6	3.3	2.1	9.3
34	9 08.5	9 10.0	8 43.5	3.4	2.1	9.4	34	9 23.5	9 25.0	8 57.8	3.4	2.1	9.4
35	9 08.8	9 10.3	8 43.8	3.5	2.1	9.5	35	9 23.8	9 25.3	8 58.1	3.5	2.2	9.5
36	9 09.0	9 10.5	8 44.0	3.6	2.2	9.6	36	9 24.0	9 25.5	8 58.3	3.6	2.3	9.6
37	9 09.3	9 10.8	8 44.2	3.7	2.3	9.7	37	9 24.3	9 25.8	8 58.5	3.7	2.3	9.7
38	9 09.5	9 11.0	8 44.5	3.8	2.3	9.8	38	9 24.5	9 26.0	8 58.8	3.8	2.4	9.8
39	9 09.8	9 11.3	8 44.7	3.9	2.4	9.9	39	9 24.8	9 26.3	8 59.0	3.9	2.4	9.9
40	9 10.0	9 11.5	8 44.9	4.0	2.4	10.0	40	9 25.0	9 26.5	8 59.3	4.0	2.5	10.0
41	9 10.3	9 11.8	8 45.2	4.1	2.5	10.1	41	9 25.3	9 26.8	8 59.5	4.1	2.6	10.1
42	9 10.5	9 12.0	8 45.4	4.2	2.6	10.2	42	9 25.5	9 27.0	8 59.7	4.2	2.6	10.2
43	9 10.8	9 12.3	8 45.7	4.3	2.6	10.3	43	9 25.8	9 27.3	9 00.0	4.3	2.7	10.3
44	9 11.0	9 12.5	8 45.9	4.4	2.7	10.4	44	9 26.0	9 27.5	9 00.2	4.4	2.8	10.4
45	9 11.3	9 12.8	8 46.1	4.5	2.7	10.5	45	9 26.3	9 27.8	9 00.5	4.5	2.8	10.5
46	9 11.5	9 13.0	8 46.4	4.6	2.8	10.6	46	9 26.5	9 28.1	9 00.7	4.6	2.9	10.6
47	9 11.8	9 13.3	8 46.6	4.7	2.9	10.7	47	9 26.8	9 28.3	9 00.9	4.7	2.9	10.7
48	9 12.0	9 13.5	8 46.9	4.8	2.9	10.8	48	9 27.0	9 28.6	9 01.2	4.8	3.0	10.8
49	9 12.3	9 13.8	8 47.1	4.9	3.0	10.9	49	9 27.3	9 28.8	9 01.4	4.9	3.1	10.9
50	9 12.5	9 14.0	8 47.3	5.0	3.0	11.0	50	9 27.5	9 29.1	9 01.6	5.0	3.1	11.0
51	9 12.8	9 14.3	8 47.6	5.1	3.1	11.1	51	9 27.8	9 29.3	9 01.9	5.1	3.2	11.1
52	9 13.0	9 14.5	8 47.8	5.2	3.2	11.2	52	9 28.0	9 29.6	9 02.1	5.2	3.3	11.2
53	9 13.3	9 14.8	8 48.0	5.3	3.2	11.3	53	9 28.3	9 29.8	9 02.4	5.3	3.3	11.3
54	9 13.5	9 15.0	8 48.3	5.4	3.3	11.4	54	9 28.5	9 30.1	9 02.6	5.4	3.4	11.4
55	9 13.8	9 15.3	8 48.5	5.5	3.3	11.5	55	9 28.8	9 30.3	9 02.8	5.5	3.4	11.5
56	9 14.0	9 15.5	8 48.8	5.6	3.4	11.6	56	9 29.0	9 30.6	9 03.1	5.6	3.5	11.6
57	9 14.3	9 15.8	8 49.0	5.7	3.5	11.7	57	9 29.3	9 30.8	9 03.3	5.7	3.6	11.7
58	9 14.5	9 16.0	8 49.2	5.8	3.5	11.8	58	9 29.5	9 31.1	9 03.6	5.8	3.6	11.8
59	9 14.8	9 16.3	8 49.5	5.9	3.6	11.9	59	9 29.8	9 31.3	9 03.8	5.9	3.7	11.9
60	9 15.0	9 16.5	8 49.7	6.0	3.7	12.0	60	9 30.0	9 31.6	9 04.0	6.0	3.8	12.0

38 ^m	SUN PLANETS	ARIES	MOON	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	39 ^m	SUN PLANETS	ARIES	MOON	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$	$\overset{v}{\text{or}} \overset{d}{\text{Corr}}^n$
s	o /	o /	o /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /
00	9 30.0	9 31.6	9 04.0	0.0 0.0	6.0 3.9	12.0 7.7	00	9 45.0	9 46.6	9 18.4	0.0 0.0	6.0 4.0	12.0 7.9
01	9 30.3	9 31.8	9 04.3	0.1 0.1	6.1 3.9	12.1 7.8	01	9 45.3	9 46.9	9 18.6	0.1 0.1	6.1 4.0	12.1 8.0
02	9 30.5	9 32.1	9 04.5	0.2 0.1	6.2 4.0	12.2 7.8	02	9 45.5	9 47.1	9 18.8	0.2 0.1	6.2 4.1	12.2 8.0
03	9 30.8	9 32.3	9 04.7	0.3 0.2	6.3 4.0	12.3 7.9	03	9 45.8	9 47.4	9 19.1	0.3 0.2	6.3 4.1	12.3 8.1
04	9 31.0	9 32.6	9 05.0	0.4 0.3	6.4 4.1	12.4 8.0	04	9 46.0	9 47.6	9 19.3	0.4 0.3	6.4 4.2	12.4 8.2
05	9 31.3	9 32.8	9 05.2	0.5 0.3	6.5 4.2	12.5 8.0	05	9 46.3	9 47.9	9 19.5	0.5 0.3	6.5 4.3	12.5 8.2
06	9 31.5	9 33.1	9 05.5	0.6 0.4	6.6 4.2	12.6 8.1	06	9 46.5	9 48.1	9 19.8	0.6 0.4	6.6 4.3	12.6 8.3
07	9 31.8	9 33.3	9 05.7	0.7 0.4	6.7 4.3	12.7 8.1	07	9 46.8	9 48.4	9 20.0	0.7 0.5	6.7 4.4	12.7 8.4
08	9 32.0	9 33.6	9 05.9	0.8 0.5	6.8 4.4	12.8 8.2	08	9 47.0	9 48.6	9 20.3	0.8 0.5	6.8 4.5	12.8 8.4
09	9 32.3	9 33.8	9 06.2	0.9 0.6	6.9 4.4	12.9 8.3	09	9 47.3	9 48.9	9 20.5	0.9 0.6	6.9 4.5	12.9 8.5
10	9 32.5	9 34.1	9 06.4	1.0 0.6	7.0 4.5	13.0 8.3	10	9 47.5	9 49.1	9 20.7	1.0 0.7	7.0 4.6	13.0 8.6
11	9 32.8	9 34.3	9 06.7	1.1 0.7	7.1 4.6	13.1 8.4	11	9 47.8	9 49.4	9 21.0	1.1 0.7	7.1 4.7	13.1 8.6
12	9 33.0	9 34.6	9 06.9	1.2 0.8	7.2 4.6	13.2 8.5	12	9 48.0	9 49.6	9 21.2	1.2 0.8	7.2 4.7	13.2 8.7
13	9 33.3	9 34.8	9 07.1	1.3 0.8	7.3 4.7	13.3 8.5	13	9 48.3	9 49.9	9 21.5	1.3 0.9	7.3 4.8	13.3 8.8
14	9 33.5	9 35.1	9 07.4	1.4 0.9	7.4 4.7	13.4 8.6	14	9 48.5	9 50.1	9 21.7	1.4 0.9	7.4 4.9	13.4 8.8
15	9 33.8	9 35.3	9 07.6	1.5 1.0	7.5 4.8	13.5 8.7	15	9 48.8	9 50.4	9 21.9	1.5 1.0	7.5 4.9	13.5 8.9
16	9 34.0	9 35.6	9 07.9	1.6 1.0	7.6 4.9	13.6 8.7	16	9 49.0	9 50.6	9 22.2	1.6 1.1	7.6 5.0	13.6 9.0
17	9 34.3	9 35.8	9 08.1	1.7 1.1	7.7 4.9	13.7 8.8	17	9 49.3	9 50.9	9 22.4	1.7 1.1	7.7 5.1	13.7 9.0
18	9 34.5	9 36.1	9 08.3	1.8 1.2	7.8 5.0	13.8 8.9	18	9 49.5	9 51.1	9 22.6	1.8 1.2	7.8 5.1	13.8 9.1
19	9 34.8	9 36.3	9 08.6	1.9 1.2	7.9 5.1	13.9 8.9	19	9 49.8	9 51.4	9 22.9	1.9 1.3	7.9 5.2	13.9 9.2
20	9 35.0	9 36.6	9 08.8	2.0 1.3	8.0 5.1	14.0 9.0	20	9 50.0	9 51.6	9 23.1	2.0 1.3	8.0 5.3	14.0 9.2
21	9 35.3	9 36.8	9 09.0	2.1 1.3	8.1 5.2	14.1 9.0	21	9 50.3	9 51.9	9 23.4	2.1 1.4	8.1 5.3	14.1 9.3
22	9 35.5	9 37.1	9 09.3	2.2 1.4	8.2 5.3	14.2 9.1	22	9 50.5	9 52.1	9 23.6	2.2 1.4	8.2 5.4	14.2 9.3
23	9 35.8	9 37.3	9 09.5	2.3 1.5	8.3 5.3	14.3 9.2	23	9 50.8	9 52.4	9 23.8	2.3 1.5	8.3 5.5	14.3 9.4
24	9 36.0	9 37.6	9 09.8	2.4 1.5	8.4 5.4	14.4 9.2	24	9 51.0	9 52.6	9 24.1	2.4 1.6	8.4 5.5	14.4 9.5
25	9 36.3	9 37.8	9 10.0	2.5 1.6	8.5 5.5	14.5 9.3	25	9 51.3	9 52.9	9 24.3	2.5 1.6	8.5 5.6	14.5 9.5
26	9 36.5	9 38.1	9 10.2	2.6 1.7	8.6 5.5	14.6 9.4	26	9 51.5	9 53.1	9 24.6	2.6 1.7	8.6 5.7	14.6 9.6
27	9 36.8	9 38.3	9 10.5	2.7 1.7	8.7 5.6	14.7 9.4	27	9 51.8	9 53.4	9 24.8	2.7 1.8	8.7 5.7	14.7 9.7
28	9 37.0	9 38.6	9 10.7	2.8 1.8	8.8 5.6	14.8 9.5	28	9 52.0	9 53.6	9 25.0	2.8 1.8	8.8 5.8	14.8 9.7
29	9 37.3	9 38.8	9 11.0	2.9 1.9	8.9 5.7	14.9 9.6	29	9 52.3	9 53.9	9 25.3	2.9 1.9	8.9 5.9	14.9 9.8
30	9 37.5	9 39.1	9 11.2	3.0 1.9	9.0 5.8	15.0 9.6	30	9 52.5	9 54.1	9 25.5	3.0 2.0	9.0 5.9	15.0 9.9
31	9 37.8	9 39.3	9 11.4	3.1 2.0	9.1 5.8	15.1 9.7	31	9 52.8	9 54.4	9 25.7	3.1 2.0	9.1 6.0	15.1 9.9
32	9 38.0	9 39.6	9 11.7	3.2 2.1	9.2 5.9	15.2 9.8	32	9 53.0	9 54.6	9 26.0	3.2 2.1	9.2 6.1	15.2 10.0
33	9 38.3	9 39.8	9 11.9	3.3 2.1	9.3 6.0	15.3 9.8	33	9 53.3	9 54.9	9 26.2	3.3 2.2	9.3 6.1	15.3 10.1
34	9 38.5	9 40.1	9 12.1	3.4 2.2	9.4 6.0	15.4 9.9	34	9 53.5	9 55.1	9 26.5	3.4 2.2	9.4 6.2	15.4 10.1
35	9 38.8	9 40.3	9 12.4	3.5 2.2	9.5 6.1	15.5 9.9	35	9 53.8	9 55.4	9 26.7	3.5 2.3	9.5 6.3	15.5 10.2
36	9 39.0	9 40.6	9 12.6	3.6 2.3	9.6 6.2	15.6 10.0	36	9 54.0	9 55.6	9 26.9	3.6 2.4	9.6 6.3	15.6 10.3
37	9 39.3	9 40.8	9 12.9	3.7 2.4	9.7 6.2	15.7 10.1	37	9 54.3	9 55.9	9 27.2	3.7 2.4	9.7 6.4	15.7 10.3
38	9 39.5	9 41.1	9 13.1	3.8 2.4	9.8 6.3	15.8 10.1	38	9 54.5	9 56.1	9 27.4	3.8 2.5	9.8 6.5	15.8 10.4
39	9 39.8	9 41.3	9 13.3	3.9 2.5	9.9 6.4	15.9 10.2	39	9 54.8	9 56.4	9 27.7	3.9 2.6	9.9 6.5	15.9 10.5
40	9 40.0	9 41.6	9 13.6	4.0 2.6	10.0 6.4	16.0 10.3	40	9 55.0	9 56.6	9 27.9	4.0 2.6	10.0 6.6	16.0 10.5
41	9 40.3	9 41.8	9 13.8	4.1 2.6	10.1 6.5	16.1 10.3	41	9 55.3	9 56.9	9 28.1	4.1 2.7	10.1 6.6	16.1 10.6
42	9 40.5	9 42.1	9 14.1	4.2 2.7	10.2 6.5	16.2 10.4	42	9 55.5	9 57.1	9 28.4	4.2 2.8	10.2 6.7	16.2 10.7
43	9 40.8	9 42.3	9 14.3	4.3 2.8	10.3 6.6	16.3 10.5	43	9 55.8	9 57.4	9 28.6	4.3 2.8	10.3 6.8	16.3 10.7
44	9 41.0	9 42.6	9 14.5	4.4 2.8	10.4 6.7	16.4 10.5	44	9 56.0	9 57.6	9 28.8	4.4 2.9	10.4 6.8	16.4 10.8
45	9 41.3	9 42.8	9 14.8	4.5 2.9	10.5 6.7	16.5 10.6	45	9 56.3	9 57.9	9 29.1	4.5 3.0	10.5 6.9	16.5 10.9
46	9 41.5	9 43.1	9 15.0	4.6 3.0	10.6 6.8	16.6 10.7	46	9 56.5	9 58.1	9 29.3	4.6 3.0	10.6 7.0	16.6 10.9
47	9 41.8	9 43.3	9 15.2	4.7 3.0	10.7 6.9	16.7 10.7	47	9 56.8	9 58.4	9 29.6	4.7 3.1	10.7 7.0	16.7 11.0
48	9 42.0	9 43.6	9 15.5	4.8 3.1	10.8 6.9	16.8 10.8	48	9 57.0	9 58.6	9 29.8	4.8 3.2	10.8 7.1	16.8 11.1
49	9 42.3	9 43.8	9 15.7	4.9 3.1	10.9 7.0	16.9 10.8	49	9 57.3	9 58.9	9 30.0	4.9 3.2	10.9 7.2	16.9 11.1
50	9 42.5	9 44.1	9 16.0	5.0 3.2	11.0 7.1	17.0 10.9	50	9 57.5	9 59.1	9 30.3	5.0 3.3	11.0 7.2	17.0 11.2
51	9 42.8	9 44.3	9 16.2	5.1 3.3	11.1 7.1	17.1 11.0	51	9 57.8	9 59.4	9 30.5	5.1 3.4	11.1 7.3	17.1 11.3
52	9 43.0	9 44.6	9 16.4	5.2 3.3	11.2 7.2	17.2 11.0	52	9 58.0	9 59.6	9 30.8	5.2 3.4	11.2 7.4	17.2 11.3
53	9 43.3	9 44.8	9 16.7	5.3 3.4	11.3 7.3	17.3 11.1	53	9 58.3	9 59.9	9 31.0	5.3 3.5	11.3 7.4	17.3 11.4
54	9 43.5	9 45.1	9 16.9	5.4 3.5	11.4 7.3	17.4 11.2	54	9 58.5	10 00.1	9 31.2	5.4 3.6	11.4 7.5	17.4 11.5
55	9 43.8	9 45.3	9 17.2	5.5 3.5	11.5 7.4	17.5 11.2	55	9 58.8	10 00.4	9 31.5	5.5 3.6	11.5 7.6	17.5 11.5
56	9 44.0	9 45.6	9 17.4	5.6 3.6	11.6 7.4	17.6 11.3	56	9 59.0	10 00.6	9 31.7	5.6 3.7	11.6 7.6	17.6 11.6
57	9 44.3	9 45.8	9 17.6	5.7 3.7	11.7 7.5	17.7 11.4	57	9 59.3	10 00.9	9 32.0	5.7 3.8	11.7 7.7	17.7 11.7
58	9 44.5	9 46.1	9 17.9	5.8 3.7	11.8 7.6	17.8 11.4	58	9 59.5	10 01.1	9 32.2	5.8 3.8	11.8 7.8	17.8 11.7
59	9 44.8	9 46.4	9 18.1	5.9 3.8	11.9 7.6	17.9 11.5	59	9 59.8	10 01.4	9 32.4	5.9 3.9	11.9 7.8	17.9 11.8
60	9 45.0	9 46.6	9 18.4	6.0 3.9	12.0 7.7	18.0 11.6	60	10 00.0	10 01.6	9 32.7	6.0 4.0	12.0 7.9	18.0 11.9

^m 40	SUN PLANETS	ARIES	MOON	^r or d	Corr ⁿ	^r or d	Corr ⁿ	^r or d	Corr ⁿ
s	o	/	o	/	/	/	/	/	/
00	10 00.0	10 01.6	9 32.7	0.0	0.0	6.0	4.1	12.0	8.1
01	10 00.3	10 01.9	9 32.9	0.1	0.1	6.1	4.1	12.1	8.2
02	10 00.5	10 02.1	9 33.1	0.2	0.1	6.2	4.2	12.2	8.2
03	10 00.8	10 02.4	9 33.4	0.3	0.2	6.3	4.3	12.3	8.3
04	10 01.0	10 02.6	9 33.6	0.4	0.3	6.4	4.3	12.4	8.4
05	10 01.3	10 02.9	9 33.9	0.5	0.3	6.5	4.4	12.5	8.4
06	10 01.5	10 03.1	9 34.1	0.6	0.4	6.6	4.5	12.6	8.5
07	10 01.8	10 03.4	9 34.3	0.7	0.5	6.7	4.5	12.7	8.6
08	10 02.0	10 03.6	9 34.6	0.8	0.5	6.8	4.6	12.8	8.6
09	10 02.3	10 03.9	9 34.8	0.9	0.6	6.9	4.7	12.9	8.7
10	10 02.5	10 04.1	9 35.1	1.0	0.7	7.0	4.7	13.0	8.8
11	10 02.8	10 04.4	9 35.3	1.1	0.7	7.1	4.8	13.1	8.8
12	10 03.0	10 04.7	9 35.5	1.2	0.8	7.2	4.9	13.2	8.9
13	10 03.3	10 04.9	9 35.8	1.3	0.9	7.3	4.9	13.3	9.0
14	10 03.5	10 05.2	9 36.0	1.4	0.9	7.4	5.0	13.4	9.0
15	10 03.8	10 05.4	9 36.2	1.5	1.0	7.5	5.1	13.5	9.1
16	10 04.0	10 05.7	9 36.5	1.6	1.1	7.6	5.1	13.6	9.2
17	10 04.3	10 05.9	9 36.7	1.7	1.1	7.7	5.2	13.7	9.2
18	10 04.5	10 06.2	9 37.0	1.8	1.2	7.8	5.3	13.8	9.3
19	10 04.8	10 06.4	9 37.2	1.9	1.3	7.9	5.3	13.9	9.4
20	10 05.0	10 06.7	9 37.4	2.0	1.4	8.0	5.4	14.0	9.5
21	10 05.3	10 06.9	9 37.7	2.1	1.4	8.1	5.5	14.1	9.5
22	10 05.5	10 07.2	9 37.9	2.2	1.5	8.2	5.5	14.2	9.6
23	10 05.8	10 07.4	9 38.2	2.3	1.6	8.3	5.6	14.3	9.7
24	10 06.0	10 07.7	9 38.4	2.4	1.6	8.4	5.7	14.4	9.7
25	10 06.3	10 07.9	9 38.6	2.5	1.7	8.5	5.7	14.5	9.8
26	10 06.5	10 08.2	9 38.9	2.6	1.8	8.6	5.8	14.6	9.9
27	10 06.8	10 08.4	9 39.1	2.7	1.8	8.7	5.9	14.7	9.9
28	10 07.0	10 08.7	9 39.3	2.8	1.9	8.8	5.9	14.8	10.0
29	10 07.3	10 08.9	9 39.6	2.9	2.0	8.9	6.0	14.9	10.1
30	10 07.5	10 09.2	9 39.8	3.0	2.0	9.0	6.1	15.0	10.1
31	10 07.8	10 09.4	9 40.1	3.1	2.1	9.1	6.1	15.1	10.2
32	10 08.0	10 09.7	9 40.3	3.2	2.2	9.2	6.2	15.2	10.3
33	10 08.3	10 09.9	9 40.5	3.3	2.2	9.3	6.3	15.3	10.3
34	10 08.5	10 10.2	9 40.8	3.4	2.3	9.4	6.3	15.4	10.4
35	10 08.8	10 10.4	9 41.0	3.5	2.4	9.5	6.4	15.5	10.5
36	10 09.0	10 10.7	9 41.3	3.6	2.4	9.6	6.5	15.6	10.5
37	10 09.3	10 10.9	9 41.5	3.7	2.5	9.7	6.5	15.7	10.6
38	10 09.5	10 11.2	9 41.7	3.8	2.6	9.8	6.6	15.8	10.7
39	10 09.8	10 11.4	9 42.0	3.9	2.6	9.9	6.7	15.9	10.7
40	10 10.0	10 11.7	9 42.2	4.0	2.7	10.0	6.8	16.0	10.8
41	10 10.3	10 11.9	9 42.4	4.1	2.8	10.1	6.8	16.1	10.9
42	10 10.5	10 12.2	9 42.7	4.2	2.8	10.2	6.9	16.2	10.9
43	10 10.8	10 12.4	9 42.9	4.3	2.9	10.3	7.0	16.3	11.0
44	10 11.0	10 12.7	9 43.2	4.4	3.0	10.4	7.0	16.4	11.1
45	10 11.3	10 12.9	9 43.4	4.5	3.0	10.5	7.1	16.5	11.1
46	10 11.5	10 13.2	9 43.6	4.6	3.1	10.6	7.2	16.6	11.2
47	10 11.8	10 13.4	9 43.9	4.7	3.2	10.7	7.2	16.7	11.3
48	10 12.0	10 13.7	9 44.1	4.8	3.2	10.8	7.3	16.8	11.3
49	10 12.3	10 13.9	9 44.4	4.9	3.3	10.9	7.4	16.9	11.4
50	10 12.5	10 14.2	9 44.6	5.0	3.4	11.0	7.4	17.0	11.5
51	10 12.8	10 14.4	9 44.8	5.1	3.4	11.1	7.5	17.1	11.5
52	10 13.0	10 14.7	9 45.1	5.2	3.5	11.2	7.6	17.2	11.6
53	10 13.3	10 14.9	9 45.3	5.3	3.6	11.3	7.6	17.3	11.7
54	10 13.5	10 15.2	9 45.6	5.4	3.6	11.4	7.7	17.4	11.7
55	10 13.8	10 15.4	9 45.8	5.5	3.7	11.5	7.8	17.5	11.8
56	10 14.0	10 15.7	9 46.0	5.6	3.8	11.6	7.8	17.6	11.9
57	10 14.3	10 15.9	9 46.3	5.7	3.8	11.7	7.9	17.7	11.9
58	10 14.5	10 16.2	9 46.5	5.8	3.9	11.8	8.0	17.8	12.0
59	10 14.8	10 16.4	9 46.7	5.9	4.0	11.9	8.0	17.9	12.1
60	10 15.0	10 16.7	9 47.0	6.0	4.1	12.0	8.1	18.0	12.2

^m 41	SUN PLANETS	ARIES	MOON	^r or d	Corr ⁿ	^r or d	Corr ⁿ	^r or d	Corr ⁿ
s	o	/	o	/	/	/	/	/	/
00	10 15.0	10 16.7	9 47.0	0.0	0.0	6.0	4.2	12.0	8.3
01	10 15.3	10 16.9	9 47.2	0.1	0.1	6.1	4.2	12.1	8.4
02	10 15.5	10 17.2	9 47.5	0.2	0.1	6.2	4.3	12.2	8.4
03	10 15.8	10 17.4	9 47.7	0.3	0.2	6.3	4.4	12.3	8.5
04	10 16.0	10 17.7	9 47.9	0.4	0.3	6.4	4.4	12.4	8.6
05	10 16.3	10 17.9	9 48.2	0.5	0.3	6.5	4.5	12.5	8.6
06	10 16.5	10 18.2	9 48.4	0.6	0.4	6.6	4.6	12.6	8.7
07	10 16.8	10 18.4	9 48.7	0.7	0.5	6.7	4.6	12.7	8.8
08	10 17.0	10 18.7	9 48.9	0.8	0.6	6.8	4.7	12.8	8.9
09	10 17.3	10 18.9	9 49.1	0.9	0.6	6.9	4.8	12.9	8.9
10	10 17.5	10 19.2	9 49.4	1.0	0.7	7.0	4.8	13.0	9.0
11	10 17.8	10 19.4	9 49.6	1.1	0.8	7.1	4.9	13.1	9.1
12	10 18.0	10 19.7	9 49.8	1.2	0.8	7.2	5.0	13.2	9.1
13	10 18.3	10 19.9	9 50.1	1.3	0.9	7.3	5.0	13.3	9.2
14	10 18.5	10 20.2	9 50.3	1.4	1.0	7.4	5.1	13.4	9.3
15	10 18.8	10 20.4	9 50.6	1.5	1.0	7.5	5.2	13.5	9.3
16	10 19.0	10 20.7	9 50.8	1.6	1.1	7.6	5.3	13.6	9.4
17	10 19.3	10 20.9	9 51.0	1.7	1.2	7.7	5.3	13.7	9.5
18	10 19.5	10 21.2	9 51.3	1.8	1.2	7.8	5.4	13.8	9.5
19	10 19.8	10 21.4	9 51.5	1.9	1.3	7.9	5.5	13.9	9.6
20	10 20.0	10 21.7	9 51.8	2.0	1.4	8.0	5.5	14.0	9.7
21	10 20.3	10 21.9	9 52.0	2.1	1.5	8.1	5.6	14.1	9.8
22	10 20.5	10 22.2	9 52.2	2.2	1.5	8.2	5.7	14.2	9.8
23	10 20.8	10 22.4	9 52.5	2.3	1.6	8.3	5.7	14.3	9.9
24	10 21.0	10 22.7	9 52.7	2.4	1.7	8.4	5.8	14.4	10.0
25	10 21.3	10 23.0	9 52.9	2.5	1.7	8.5	5.9	14.5	10.0
26	10 21.5	10 23.2	9 53.2	2.6	1.8	8.6	5.9	14.6	10.1
27	10 21.8	10 23.5	9 53.4	2.7	1.9	8.7	6.0	14.7	10.2
28	10 22.0	10 23.7	9 53.7	2.8	1.9	8.8	6.1	14.8	10.2
29	10 22.3	10 24.0	9 53.9	2.9	2.0	8.9	6.2	14.9	10.3
30	10 22.5	10 24.2	9 54.1	3.0	2.1	9.0	6.2	15.0	10.4
31	10 22.8	10 24.5	9 54.4	3.1	2.1	9.1	6.3	15.1	10.4
32	10 23.0	10 24.7	9 54.6	3.2	2.2	9.2	6.4	15.2	10.5
33	10 23.3	10 25.0	9 54.9	3.3	2.3	9.3	6.4	15.3	10.6
34	10 23.5	10 25.2	9 55.1	3.4	2.4	9.4	6.5	15.4	10.7
35	10 23.8	10 25.5	9 55.3	3.5	2.4	9.5	6.6	15.5	10.7
36	10 24.0	10 25.7	9 55.6	3.6	2.5	9.6	6.6	15.6	10.8
37	10 24.3	10 26.0	9 55.8	3.7	2.6	9.7	6.7	15.7	10.9
38	10 24.5	10 26.2	9 56.1	3.8	2.6	9.8	6.8	15.8	10.9
39	10 24.8	10 26.5	9 56.3	3.9	2.7	9.9	6.8	15.9	11.0
40	10 25.0	10 26.7	9 56.5	4.0	2.8	10.0	6.9	16.0	11.1
41	10 25.3	10 27.0	9 56.8	4.1	2.8	10.1	7.0	16.1	11.1
42	10 25.5	10 27.2	9 57.0	4.2	2.9	10.2	7.1	16.2	11.2
43	10 25.8	10 27.5	9 57.2	4.3	3.0	10.3	7.1	16.3	11.3
44	10 26.0	10 27.7	9 57.5	4.4	3.0	10.4	7.2	16.4	11.3
45	10 26.3	10 28.0	9 57.7	4.5	3.1	10.5	7.3	16.5	11.4
46	10 26.5	10 28.2	9 58.0	4.6	3.2	10.6	7.3	16.6	11.5
47	10 26.8	10 28.5	9 58.2	4.7	3.3	10.7	7.4	16.7	11.6
48	10 27.0	10 28.7	9 58.4	4.8	3.3	10.8	7.5	16.8	11.6
49	10 27.3	10 29.0	9 58.7	4.9	3.4	10.9	7.5	16.9	11.7
50	10 27.5	10 29.2	9 58.9	5.0	3.5	11.0	7.6	17.0	11.8
51	10 27.8	10 29.5	9 59.2	5.1	3.5	11.1	7.7	17.1	11.8
52	10 28.0	10 29.7	9 59.4	5.2	3.6	11.2	7.7	17.2	11.9
53	10 28.3	10 30.0	9 59.6	5.3	3.7	11.3	7.8	17.3	12.0
54	10 28.5	10 30.2	9 59.9	5.4	3.7	11.4	7.9	17.4	12.0
55	10 28.8	10 30.5	10 00.1	5.5	3.8	11.5	8.0	17.5	12.1
56	10 29.0	10 30.7	10 00.3	5.6	3.9	11.6	8.0	17.6	12.2
57	10 29.3	10 31.0	10 00.6	5.7	3.9	11.7	8.1	17.7	12.2
58	10 29.5	10 31.2	10 00.8	5.8	4.0	11.8	8.2	17.8	12.3
59	10 29.8	10 31.5	10 01.1	5.9	4.1	11.9	8.2	17.9	12.4
60	10 30.0	10 31.7	10 01.3	6.0	4.2	12.0	8.3	18.0	12.5

^m 42	SUN PLANETS	ARIES	MOON	^v or d Corr ⁿ	^v or d Corr ⁿ	^v or d Corr ⁿ	^m 43	SUN PLANETS	ARIES	MOON	^v or d Corr ⁿ	^v or d Corr ⁿ	^v or d Corr ⁿ
^s	^o [′] [″]	^o [′] [″]	^o [′] [″]	[″] [″] [″]	[″] [″] [″]	[″] [″] [″]	^s	^o [′] [″]	^o [′] [″]	^o [′] [″]	[″] [″] [″]	[″] [″] [″]	[″] [″] [″]
00	10 30.0	10 31.7	10 01.3	0.0 0.0	6.0 4.3	12.0 8.5	00	10 45.0	10 46.8	10 15.6	0.0 0.0	6.0 4.4	12.0 8.7
01	10 30.3	10 32.0	10 01.5	0.1 0.1	6.1 4.3	12.1 8.6	01	10 45.3	10 47.0	10 15.9	0.1 0.1	6.1 4.4	12.1 8.8
02	10 30.5	10 32.2	10 01.8	0.2 0.1	6.2 4.4	12.2 8.6	02	10 45.5	10 47.3	10 16.1	0.2 0.1	6.2 4.5	12.2 8.8
03	10 30.8	10 32.5	10 02.0	0.3 0.2	6.3 4.5	12.3 8.7	03	10 45.8	10 47.5	10 16.3	0.3 0.2	6.3 4.6	12.3 8.9
04	10 31.0	10 32.7	10 02.3	0.4 0.3	6.4 4.5	12.4 8.8	04	10 46.0	10 47.8	10 16.6	0.4 0.3	6.4 4.6	12.4 9.0
05	10 31.3	10 33.0	10 02.5	0.5 0.4	6.5 4.6	12.5 8.9	05	10 46.3	10 48.0	10 16.8	0.5 0.4	6.5 4.7	12.5 9.1
06	10 31.5	10 33.2	10 02.7	0.6 0.4	6.6 4.7	12.6 8.9	06	10 46.5	10 48.3	10 17.0	0.6 0.4	6.6 4.8	12.6 9.1
07	10 31.8	10 33.5	10 03.0	0.7 0.5	6.7 4.7	12.7 9.0	07	10 46.8	10 48.5	10 17.3	0.7 0.5	6.7 4.9	12.7 9.2
08	10 32.0	10 33.7	10 03.2	0.8 0.6	6.8 4.8	12.8 9.1	08	10 47.0	10 48.8	10 17.5	0.8 0.6	6.8 4.9	12.8 9.3
09	10 32.3	10 34.0	10 03.4	0.9 0.6	6.9 4.9	12.9 9.1	09	10 47.3	10 49.0	10 17.8	0.9 0.7	6.9 5.0	12.9 9.4
10	10 32.5	10 34.2	10 03.7	1.0 0.7	7.0 5.0	13.0 9.2	10	10 47.5	10 49.3	10 18.0	1.0 0.7	7.0 5.1	13.0 9.4
11	10 32.8	10 34.5	10 03.9	1.1 0.8	7.1 5.0	13.1 9.3	11	10 47.8	10 49.5	10 18.2	1.1 0.8	7.1 5.1	13.1 9.5
12	10 33.0	10 34.7	10 04.2	1.2 0.9	7.2 5.1	13.2 9.4	12	10 48.0	10 49.8	10 18.5	1.2 0.9	7.2 5.2	13.2 9.6
13	10 33.3	10 35.0	10 04.4	1.3 0.9	7.3 5.2	13.3 9.4	13	10 48.3	10 50.0	10 18.7	1.3 0.9	7.3 5.3	13.3 9.6
14	10 33.5	10 35.2	10 04.6	1.4 1.0	7.4 5.2	13.4 9.5	14	10 48.5	10 50.3	10 19.0	1.4 1.0	7.4 5.4	13.4 9.7
15	10 33.8	10 35.5	10 04.9	1.5 1.1	7.5 5.3	13.5 9.6	15	10 48.8	10 50.5	10 19.2	1.5 1.1	7.5 5.4	13.5 9.8
16	10 34.0	10 35.7	10 05.1	1.6 1.1	7.6 5.4	13.6 9.6	16	10 49.0	10 50.8	10 19.4	1.6 1.2	7.6 5.5	13.6 9.9
17	10 34.3	10 36.0	10 05.4	1.7 1.2	7.7 5.5	13.7 9.7	17	10 49.3	10 51.0	10 19.7	1.7 1.2	7.7 5.6	13.7 9.9
18	10 34.5	10 36.2	10 05.6	1.8 1.3	7.8 5.5	13.8 9.8	18	10 49.5	10 51.3	10 19.9	1.8 1.3	7.8 5.7	13.8 10.0
19	10 34.8	10 36.5	10 05.8	1.9 1.3	7.9 5.6	13.9 9.8	19	10 49.8	10 51.5	10 20.2	1.9 1.4	7.9 5.7	13.9 10.1
20	10 35.0	10 36.7	10 06.1	2.0 1.4	8.0 5.7	14.0 9.9	20	10 50.0	10 51.8	10 20.4	2.0 1.5	8.0 5.8	14.0 10.2
21	10 35.3	10 37.0	10 06.3	2.1 1.5	8.1 5.7	14.1 10.0	21	10 50.3	10 52.0	10 20.6	2.1 1.5	8.1 5.9	14.1 10.2
22	10 35.5	10 37.2	10 06.5	2.2 1.6	8.2 5.8	14.2 10.1	22	10 50.5	10 52.3	10 20.9	2.2 1.6	8.2 5.9	14.2 10.3
23	10 35.8	10 37.5	10 06.8	2.3 1.6	8.3 5.9	14.3 10.1	23	10 50.8	10 52.5	10 21.1	2.3 1.7	8.3 6.0	14.3 10.4
24	10 36.0	10 37.7	10 07.0	2.4 1.7	8.4 6.0	14.4 10.2	24	10 51.0	10 52.8	10 21.3	2.4 1.7	8.4 6.1	14.4 10.4
25	10 36.3	10 38.0	10 07.3	2.5 1.8	8.5 6.0	14.5 10.3	25	10 51.3	10 53.0	10 21.6	2.5 1.8	8.5 6.2	14.5 10.5
26	10 36.5	10 38.2	10 07.5	2.6 1.8	8.6 6.1	14.6 10.3	26	10 51.5	10 53.3	10 21.8	2.6 1.9	8.6 6.2	14.6 10.6
27	10 36.8	10 38.5	10 07.7	2.7 1.9	8.7 6.2	14.7 10.4	27	10 51.8	10 53.5	10 22.1	2.7 2.0	8.7 6.3	14.7 10.7
28	10 37.0	10 38.7	10 08.0	2.8 2.0	8.8 6.2	14.8 10.5	28	10 52.0	10 53.8	10 22.3	2.8 2.0	8.8 6.4	14.8 10.7
29	10 37.3	10 39.0	10 08.2	2.9 2.1	8.9 6.3	14.9 10.6	29	10 52.3	10 54.0	10 22.5	2.9 2.1	8.9 6.5	14.9 10.8
30	10 37.5	10 39.2	10 08.5	3.0 2.1	9.0 6.4	15.0 10.6	30	10 52.5	10 54.3	10 22.8	3.0 2.2	9.0 6.5	15.0 10.9
31	10 37.8	10 39.5	10 08.7	3.1 2.2	9.1 6.4	15.1 10.7	31	10 52.8	10 54.5	10 23.0	3.1 2.2	9.1 6.6	15.1 10.9
32	10 38.0	10 39.7	10 08.9	3.2 2.3	9.2 6.5	15.2 10.8	32	10 53.0	10 54.8	10 23.3	3.2 2.3	9.2 6.7	15.2 11.0
33	10 38.3	10 40.0	10 09.2	3.3 2.3	9.3 6.6	15.3 10.8	33	10 53.3	10 55.0	10 23.5	3.3 2.4	9.3 6.7	15.3 11.1
34	10 38.5	10 40.2	10 09.4	3.4 2.4	9.4 6.7	15.4 10.9	34	10 53.5	10 55.3	10 23.7	3.4 2.5	9.4 6.8	15.4 11.2
35	10 38.8	10 40.5	10 09.7	3.5 2.5	9.5 6.7	15.5 11.0	35	10 53.8	10 55.5	10 24.0	3.5 2.5	9.5 6.9	15.5 11.2
36	10 39.0	10 40.7	10 09.9	3.6 2.6	9.6 6.8	15.6 11.1	36	10 54.0	10 55.8	10 24.2	3.6 2.6	9.6 7.0	15.6 11.3
37	10 39.3	10 41.0	10 10.1	3.7 2.6	9.7 6.9	15.7 11.1	37	10 54.3	10 56.0	10 24.4	3.7 2.7	9.7 7.0	15.7 11.4
38	10 39.5	10 41.3	10 10.4	3.8 2.7	9.8 6.9	15.8 11.2	38	10 54.5	10 56.3	10 24.7	3.8 2.8	9.8 7.1	15.8 11.5
39	10 39.8	10 41.5	10 10.6	3.9 2.8	9.9 7.0	15.9 11.3	39	10 54.8	10 56.5	10 24.9	3.9 2.8	9.9 7.2	15.9 11.5
40	10 40.0	10 41.8	10 10.8	4.0 2.8	10.0 7.1	16.0 11.3	40	10 55.0	10 56.8	10 25.2	4.0 2.9	10.0 7.3	16.0 11.6
41	10 40.3	10 42.0	10 11.1	4.1 2.9	10.1 7.2	16.1 11.4	41	10 55.3	10 57.0	10 25.4	4.1 3.0	10.1 7.3	16.1 11.7
42	10 40.5	10 42.3	10 11.3	4.2 3.0	10.2 7.2	16.2 11.5	42	10 55.5	10 57.3	10 25.6	4.2 3.0	10.2 7.4	16.2 11.7
43	10 40.8	10 42.5	10 11.6	4.3 3.0	10.3 7.3	16.3 11.5	43	10 55.8	10 57.5	10 25.9	4.3 3.1	10.3 7.5	16.3 11.8
44	10 41.0	10 42.8	10 11.8	4.4 3.1	10.4 7.4	16.4 11.6	44	10 56.0	10 57.8	10 26.1	4.4 3.2	10.4 7.5	16.4 11.9
45	10 41.3	10 43.0	10 12.0	4.5 3.2	10.5 7.4	16.5 11.7	45	10 56.3	10 58.0	10 26.4	4.5 3.3	10.5 7.6	16.5 12.0
46	10 41.5	10 43.3	10 12.3	4.6 3.3	10.6 7.5	16.6 11.8	46	10 56.5	10 58.3	10 26.6	4.6 3.3	10.6 7.7	16.6 12.0
47	10 41.8	10 43.5	10 12.5	4.7 3.3	10.7 7.6	16.7 11.8	47	10 56.8	10 58.5	10 26.8	4.7 3.4	10.7 7.8	16.7 12.1
48	10 42.0	10 43.8	10 12.8	4.8 3.4	10.8 7.7	16.8 11.9	48	10 57.0	10 58.8	10 27.1	4.8 3.5	10.8 7.8	16.8 12.2
49	10 42.3	10 44.0	10 13.0	4.9 3.5	10.9 7.7	16.9 12.0	49	10 57.3	10 59.0	10 27.3	4.9 3.6	10.9 7.9	16.9 12.3
50	10 42.5	10 44.3	10 13.2	5.0 3.5	11.0 7.8	17.0 12.0	50	10 57.5	10 59.3	10 27.5	5.0 3.6	11.0 8.0	17.0 12.3
51	10 42.8	10 44.5	10 13.5	5.1 3.6	11.1 7.9	17.1 12.1	51	10 57.8	10 59.6	10 27.8	5.1 3.7	11.1 8.0	17.1 12.4
52	10 43.0	10 44.8	10 13.7	5.2 3.7	11.2 7.9	17.2 12.2	52	10 58.0	10 59.8	10 28.0	5.2 3.8	11.2 8.1	17.2 12.5
53	10 43.3	10 45.0	10 13.9	5.3 3.8	11.3 8.0	17.3 12.3	53	10 58.3	11 00.1	10 28.3	5.3 3.8	11.3 8.2	17.3 12.5
54	10 43.5	10 45.3	10 14.2	5.4 3.8	11.4 8.1	17.4 12.3	54	10 58.5	11 00.3	10 28.5	5.4 3.9	11.4 8.3	17.4 12.6
55	10 43.8	10 45.5	10 14.4	5.5 3.9	11.5 8.1	17.5 12.4	55	10 58.8	11 00.6	10 28.7	5.5 4.0	11.5 8.3	17.5 12.7
56	10 44.0	10 45.8	10 14.7	5.6 4.0	11.6 8.2	17.6 12.5	56	10 59.0	11 00.8	10 29.0	5.6 4.1	11.6 8.4	17.6 12.8
57	10 44.3	10 46.0	10 14.9	5.7 4.0	11.7 8.3	17.7 12.5	57	10 59.3	11 01.1	10 29.2	5.7 4.1	11.7 8.5	17.7 12.8
58	10 44.5	10 46.3	10 15.1	5.8 4.1	11.8 8.4	17.8 12.6	58	10 59.5	11 01.3	10 29.5	5.8 4.2	11.8 8.6	17.8 12.9
59	10 44.8	10 46.5	10 15.4	5.9 4.2	11.9 8.4	17.9 12.7	59	10 59.8	11 01.6	10 29.7	5.9 4.3	11.9 8.6	17.9 13.0
60	10 45.0	10 46.8	10 15.6	6.0 4.3	12.0 8.5	18.0 12.8	60	11 00.0	11 01.8	10 29.9	6.0 4.4	12.0 8.7	18.0 13.1

44 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ
s	o	i	o	i	i	i
00	11 00-0	11 01-8	10 29-9	0-0 0-0	6-0 4-5	12-0 8-9
01	11 00-3	11 02-1	10 30-2	0-1 0-1	6-1 4-5	12-1 9-0
02	11 00-5	11 02-3	10 30-4	0-2 0-1	6-2 4-6	12-2 9-0
03	11 00-8	11 02-6	10 30-6	0-3 0-2	6-3 4-7	12-3 9-1
04	11 01-0	11 02-8	10 30-9	0-4 0-3	6-4 4-7	12-4 9-2
05	11 01-3	11 03-1	10 31-1	0-5 0-4	6-5 4-8	12-5 9-3
06	11 01-5	11 03-3	10 31-4	0-6 0-4	6-6 4-9	12-6 9-3
07	11 01-8	11 03-6	10 31-6	0-7 0-5	6-7 5-0	12-7 9-4
08	11 02-0	11 03-8	10 31-8	0-8 0-6	6-8 5-0	12-8 9-5
09	11 02-3	11 04-1	10 32-1	0-9 0-7	6-9 5-1	12-9 9-6
10	11 02-5	11 04-3	10 32-3	1-0 0-7	7-0 5-2	13-0 9-6
11	11 02-8	11 04-6	10 32-6	1-1 0-8	7-1 5-3	13-1 9-7
12	11 03-0	11 04-8	10 32-8	1-2 0-9	7-2 5-3	13-2 9-8
13	11 03-3	11 05-1	10 33-0	1-3 1-0	7-3 5-4	13-3 9-9
14	11 03-5	11 05-3	10 33-3	1-4 1-0	7-4 5-5	13-4 9-9
15	11 03-8	11 05-6	10 33-5	1-5 1-1	7-5 5-6	13-5 10-0
16	11 04-0	11 05-8	10 33-8	1-6 1-2	7-6 5-6	13-6 10-1
17	11 04-3	11 06-1	10 34-0	1-7 1-3	7-7 5-7	13-7 10-2
18	11 04-5	11 06-3	10 34-2	1-8 1-3	7-8 5-8	13-8 10-2
19	11 04-8	11 06-6	10 34-5	1-9 1-4	7-9 5-9	13-9 10-3
20	11 05-0	11 06-8	10 34-7	2-0 1-5	8-0 5-9	14-0 10-4
21	11 05-3	11 07-1	10 34-9	2-1 1-6	8-1 6-0	14-1 10-5
22	11 05-5	11 07-3	10 35-2	2-2 1-6	8-2 6-1	14-2 10-5
23	11 05-8	11 07-6	10 35-4	2-3 1-7	8-3 6-2	14-3 10-6
24	11 06-0	11 07-8	10 35-7	2-4 1-8	8-4 6-2	14-4 10-7
25	11 06-3	11 08-1	10 35-9	2-5 1-9	8-5 6-3	14-5 10-8
26	11 06-5	11 08-3	10 36-1	2-6 1-9	8-6 6-4	14-6 10-8
27	11 06-8	11 08-6	10 36-4	2-7 2-0	8-7 6-5	14-7 10-9
28	11 07-0	11 08-8	10 36-6	2-8 2-1	8-8 6-5	14-8 11-0
29	11 07-3	11 09-1	10 36-9	2-9 2-2	8-9 6-6	14-9 11-1
30	11 07-5	11 09-3	10 37-1	3-0 2-2	9-0 6-7	15-0 11-1
31	11 07-8	11 09-6	10 37-3	3-1 2-3	9-1 6-7	15-1 11-2
32	11 08-0	11 09-8	10 37-6	3-2 2-4	9-2 6-8	15-2 11-3
33	11 08-3	11 10-1	10 37-8	3-3 2-4	9-3 6-9	15-3 11-3
34	11 08-5	11 10-3	10 38-0	3-4 2-5	9-4 7-0	15-4 11-4
35	11 08-8	11 10-6	10 38-3	3-5 2-6	9-5 7-0	15-5 11-5
36	11 09-0	11 10-8	10 38-5	3-6 2-7	9-6 7-1	15-6 11-6
37	11 09-3	11 11-1	10 38-8	3-7 2-7	9-7 7-2	15-7 11-6
38	11 09-5	11 11-3	10 39-0	3-8 2-8	9-8 7-3	15-8 11-7
39	11 09-8	11 11-6	10 39-2	3-9 2-9	9-9 7-3	15-9 11-8
40	11 10-0	11 11-8	10 39-5	4-0 3-0	10-0 7-4	16-0 11-9
41	11 10-3	11 12-1	10 39-7	4-1 3-0	10-1 7-5	16-1 11-9
42	11 10-5	11 12-3	10 40-0	4-2 3-1	10-2 7-6	16-2 12-0
43	11 10-8	11 12-6	10 40-2	4-3 3-2	10-3 7-6	16-3 12-1
44	11 11-0	11 12-8	10 40-4	4-4 3-3	10-4 7-7	16-4 12-2
45	11 11-3	11 13-1	10 40-7	4-5 3-3	10-5 7-8	16-5 12-2
46	11 11-5	11 13-3	10 40-9	4-6 3-4	10-6 7-9	16-6 12-3
47	11 11-8	11 13-6	10 41-1	4-7 3-5	10-7 7-9	16-7 12-4
48	11 12-0	11 13-8	10 41-4	4-8 3-6	10-8 8-0	16-8 12-5
49	11 12-3	11 14-1	10 41-6	4-9 3-6	10-9 8-1	16-9 12-5
50	11 12-5	11 14-3	10 41-9	5-0 3-7	11-0 8-2	17-0 12-6
51	11 12-8	11 14-6	10 42-1	5-1 3-8	11-1 8-2	17-1 12-7
52	11 13-0	11 14-8	10 42-3	5-2 3-9	11-2 8-3	17-2 12-8
53	11 13-3	11 15-1	10 42-6	5-3 3-9	11-3 8-4	17-3 12-8
54	11 13-5	11 15-3	10 42-8	5-4 4-0	11-4 8-5	17-4 12-9
55	11 13-8	11 15-6	10 43-1	5-5 4-1	11-5 8-5	17-5 13-0
56	11 14-0	11 15-8	10 43-3	5-6 4-2	11-6 8-6	17-6 13-1
57	11 14-3	11 16-1	10 43-5	5-7 4-2	11-7 8-7	17-7 13-1
58	11 14-5	11 16-3	10 43-8	5-8 4-3	11-8 8-8	17-8 13-2
59	11 14-8	11 16-6	10 44-0	5-9 4-4	11-9 8-8	17-9 13-3
60	11 15-0	11 16-8	10 44-3	6-0 4-5	12-0 8-9	18-0 13-4

45 ^m	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ
s	o	i	o	i	i	i
00	11 15-0	11 16-8	10 44-3	0-0 0-0	6-0 4-6	12-0 9-1
01	11 15-3	11 17-1	10 44-5	0-1 0-1	6-1 4-6	12-1 9-2
02	11 15-5	11 17-3	10 44-7	0-2 0-2	6-2 4-7	12-2 9-3
03	11 15-8	11 17-6	10 45-0	0-3 0-2	6-3 4-8	12-3 9-3
04	11 16-0	11 17-9	10 45-2	0-4 0-3	6-4 4-9	12-4 9-4
05	11 16-3	11 18-1	10 45-4	0-5 0-4	6-5 4-9	12-5 9-5
06	11 16-5	11 18-4	10 45-7	0-6 0-5	6-6 5-0	12-6 9-6
07	11 16-8	11 18-6	10 45-9	0-7 0-5	6-7 5-1	12-7 9-6
08	11 17-0	11 18-9	10 46-2	0-8 0-6	6-8 5-2	12-8 9-7
09	11 17-3	11 19-1	10 46-4	0-9 0-7	6-9 5-2	12-9 9-8
10	11 17-5	11 19-4	10 46-6	1-0 0-8	7-0 5-3	13-0 9-9
11	11 17-8	11 19-6	10 46-9	1-1 0-8	7-1 5-4	13-1 9-9
12	11 18-0	11 19-9	10 47-1	1-2 0-9	7-2 5-5	13-2 10-0
13	11 18-3	11 20-1	10 47-4	1-3 1-0	7-3 5-5	13-3 10-1
14	11 18-5	11 20-4	10 47-6	1-4 1-1	7-4 5-6	13-4 10-2
15	11 18-8	11 20-6	10 47-8	1-5 1-1	7-5 5-7	13-5 10-2
16	11 19-0	11 20-9	10 48-1	1-6 1-2	7-6 5-8	13-6 10-3
17	11 19-3	11 21-1	10 48-3	1-7 1-3	7-7 5-8	13-7 10-4
18	11 19-5	11 21-4	10 48-5	1-8 1-4	7-8 5-9	13-8 10-5
19	11 19-8	11 21-6	10 48-8	1-9 1-4	7-9 6-0	13-9 10-5
20	11 20-0	11 21-9	10 49-0	2-0 1-5	8-0 6-1	14-0 10-6
21	11 20-3	11 22-1	10 49-3	2-1 1-6	8-1 6-1	14-1 10-7
22	11 20-5	11 22-4	10 49-5	2-2 1-7	8-2 6-2	14-2 10-8
23	11 20-8	11 22-6	10 49-7	2-3 1-7	8-3 6-3	14-3 10-8
24	11 21-0	11 22-9	10 50-0	2-4 1-8	8-4 6-4	14-4 10-9
25	11 21-3	11 23-1	10 50-2	2-5 1-9	8-5 6-4	14-5 11-0
26	11 21-5	11 23-4	10 50-5	2-6 2-0	8-6 6-5	14-6 11-1
27	11 21-8	11 23-6	10 50-7	2-7 2-0	8-7 6-6	14-7 11-1
28	11 22-0	11 23-9	10 50-9	2-8 2-1	8-8 6-7	14-8 11-2
29	11 22-3	11 24-1	10 51-2	2-9 2-2	8-9 6-7	14-9 11-3
30	11 22-5	11 24-4	10 51-4	3-0 2-3	9-0 6-8	15-0 11-4
31	11 22-8	11 24-6	10 51-6	3-1 2-4	9-1 6-9	15-1 11-5
32	11 23-0	11 24-9	10 51-9	3-2 2-4	9-2 7-0	15-2 11-5
33	11 23-3	11 25-1	10 52-1	3-3 2-5	9-3 7-1	15-3 11-6
34	11 23-5	11 25-4	10 52-4	3-4 2-6	9-4 7-1	15-4 11-7
35	11 23-8	11 25-6	10 52-6	3-5 2-7	9-5 7-2	15-5 11-8
36	11 24-0	11 25-9	10 52-8	3-6 2-7	9-6 7-3	15-6 11-8
37	11 24-3	11 26-1	10 53-1	3-7 2-8	9-7 7-4	15-7 11-9
38	11 24-5	11 26-4	10 53-3	3-8 2-9	9-8 7-4	15-8 12-0
39	11 24-8	11 26-6	10 53-6	3-9 3-0	9-9 7-5	15-9 12-1
40	11 25-0	11 26-9	10 53-8	4-0 3-0	10-0 7-6	16-0 12-1
41	11 25-3	11 27-1	10 54-0	4-1 3-1	10-1 7-7	16-1 12-2
42	11 25-5	11 27-4	10 54-3	4-2 3-2	10-2 7-7	16-2 12-3
43	11 25-8	11 27-6	10 54-5	4-3 3-3	10-3 7-8	16-3 12-4
44	11 26-0	11 27-9	10 54-7	4-4 3-3	10-4 7-9	16-4 12-4
45	11 26-3	11 28-1	10 55-0	4-5 3-4	10-5 8-0	16-5 12-5
46	11 26-5	11 28-4	10 55-2	4-6 3-5	10-6 8-0	16-6 12-6
47	11 26-8	11 28-6	10 55-5	4-7 3-6	10-7 8-1	16-7 12-7
48	11 27-0	11 28-9	10 55-7	4-8 3-6	10-8 8-2	16-8 12-7
49	11 27-3	11 29-1	10 55-9	4-9 3-7	10-9 8-3	16-9 12-8
50	11 27-5	11 29-4	10 56-2	5-0 3-8	11-0 8-3	17-0 12-9
51	11 27-8	11 29-6	10 56-4	5-1 3-9	11-1 8-4	17-1 13-0
52	11 28-0	11 29-9	10 56-7	5-2 3-9	11-2 8-5	17-2 13-0
53	11 28-3	11 30-1	10 56-9	5-3 4-0	11-3 8-6	17-3 13-1
54	11 28-5	11 30-4	10 57-1	5-4 4-1	11-4 8-6	17-4 13-2
55	11 28-8	11 30-6	10 57-4	5-5 4-2	11-5 8-7	17-5 13-3
56	11 29-0	11 30-9	10 57-6	5-6 4-2	11-6 8-8	17-6 13-3
57	11 29-3	11 31-1	10 57-9	5-7 4-3	11-7 8-9	17-7 13-4
58	11 29-5	11 31-4	10 58-1	5-8 4-4	11-8 8-9	17-8 13-5
59	11 29-8	11 31-6	10 58-3	5-9 4-5	11-9 9-0	17-9 13-6
60	11 30-0	11 31-9	10 58-6	6-0 4-6	12-0 9-1	18-0 13-7

^m 46	SUN PLANETS	ARIES	MOON	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^v or d	Corr ⁿ
s	o	/	o	/	/	/	/	/	/
00	11 30.0	11 31.9	10 58.6	0.0	0.0	6.0	4.7	12.0	9.3
01	11 30.3	11 32.1	10 58.8	0.1	0.1	6.1	4.7	12.1	9.4
02	11 30.5	11 32.4	10 59.0	0.2	0.2	6.2	4.8	12.2	9.5
03	11 30.8	11 32.6	10 59.3	0.3	0.2	6.3	4.9	12.3	9.5
04	11 31.0	11 32.9	10 59.5	0.4	0.3	6.4	5.0	12.4	9.6
05	11 31.3	11 33.1	10 59.8	0.5	0.4	6.5	5.0	12.5	9.7
06	11 31.5	11 33.4	11 00.0	0.6	0.5	6.6	5.1	12.6	9.8
07	11 31.8	11 33.6	11 00.2	0.7	0.5	6.7	5.2	12.7	9.8
08	11 32.0	11 33.9	11 00.5	0.8	0.6	6.8	5.3	12.8	9.9
09	11 32.3	11 34.1	11 00.7	0.9	0.7	6.9	5.3	12.9	10.0
10	11 32.5	11 34.4	11 01.0	1.0	0.8	7.0	5.4	13.0	10.1
11	11 32.8	11 34.6	11 01.2	1.1	0.9	7.1	5.5	13.1	10.2
12	11 33.0	11 34.9	11 01.4	1.2	0.9	7.2	5.6	13.2	10.2
13	11 33.3	11 35.1	11 01.7	1.3	1.0	7.3	5.7	13.3	10.3
14	11 33.5	11 35.4	11 01.9	1.4	1.1	7.4	5.7	13.4	10.4
15	11 33.8	11 35.6	11 02.1	1.5	1.2	7.5	5.8	13.5	10.5
16	11 34.0	11 35.9	11 02.4	1.6	1.2	7.6	5.9	13.6	10.5
17	11 34.3	11 36.2	11 02.6	1.7	1.3	7.7	6.0	13.7	10.6
18	11 34.5	11 36.4	11 02.9	1.8	1.4	7.8	6.0	13.8	10.7
19	11 34.8	11 36.7	11 03.1	1.9	1.5	7.9	6.1	13.9	10.8
20	11 35.0	11 36.9	11 03.3	2.0	1.6	8.0	6.2	14.0	10.9
21	11 35.3	11 37.2	11 03.6	2.1	1.6	8.1	6.3	14.1	10.9
22	11 35.5	11 37.4	11 03.8	2.2	1.7	8.2	6.4	14.2	11.0
23	11 35.8	11 37.7	11 04.1	2.3	1.8	8.3	6.4	14.3	11.1
24	11 36.0	11 37.9	11 04.3	2.4	1.9	8.4	6.5	14.4	11.2
25	11 36.3	11 38.2	11 04.5	2.5	1.9	8.5	6.6	14.5	11.2
26	11 36.5	11 38.4	11 04.8	2.6	2.0	8.6	6.7	14.6	11.3
27	11 36.8	11 38.7	11 05.0	2.7	2.1	8.7	6.7	14.7	11.4
28	11 37.0	11 38.9	11 05.2	2.8	2.2	8.8	6.8	14.8	11.5
29	11 37.3	11 39.2	11 05.5	2.9	2.2	8.9	6.9	14.9	11.5
30	11 37.5	11 39.4	11 05.7	3.0	2.3	9.0	7.0	15.0	11.6
31	11 37.8	11 39.7	11 06.0	3.1	2.4	9.1	7.1	15.1	11.7
32	11 38.0	11 39.9	11 06.2	3.2	2.5	9.2	7.1	15.2	11.8
33	11 38.3	11 40.2	11 06.4	3.3	2.6	9.3	7.2	15.3	11.9
34	11 38.5	11 40.4	11 06.7	3.4	2.6	9.4	7.3	15.4	11.9
35	11 38.8	11 40.7	11 06.9	3.5	2.7	9.5	7.4	15.5	12.0
36	11 39.0	11 40.9	11 07.2	3.6	2.8	9.6	7.4	15.6	12.1
37	11 39.3	11 41.2	11 07.4	3.7	2.9	9.7	7.5	15.7	12.2
38	11 39.5	11 41.4	11 07.6	3.8	2.9	9.8	7.6	15.8	12.2
39	11 39.8	11 41.7	11 07.9	3.9	3.0	9.9	7.7	15.9	12.3
40	11 40.0	11 41.9	11 08.1	4.0	3.1	10.0	7.8	16.0	12.4
41	11 40.3	11 42.2	11 08.3	4.1	3.2	10.1	7.8	16.1	12.5
42	11 40.5	11 42.4	11 08.6	4.2	3.3	10.2	7.9	16.2	12.6
43	11 40.8	11 42.7	11 08.8	4.3	3.3	10.3	8.0	16.3	12.6
44	11 41.0	11 42.9	11 09.1	4.4	3.4	10.4	8.1	16.4	12.7
45	11 41.3	11 43.2	11 09.3	4.5	3.5	10.5	8.1	16.5	12.8
46	11 41.5	11 43.4	11 09.5	4.6	3.6	10.6	8.2	16.6	12.9
47	11 41.8	11 43.7	11 09.8	4.7	3.6	10.7	8.3	16.7	12.9
48	11 42.0	11 43.9	11 10.0	4.8	3.7	10.8	8.4	16.8	13.0
49	11 42.3	11 44.2	11 10.3	4.9	3.8	10.9	8.4	16.9	13.1
50	11 42.5	11 44.4	11 10.5	5.0	3.9	11.0	8.5	17.0	13.2
51	11 42.8	11 44.7	11 10.7	5.1	4.0	11.1	8.6	17.1	13.3
52	11 43.0	11 44.9	11 11.0	5.2	4.0	11.2	8.7	17.2	13.3
53	11 43.3	11 45.2	11 11.2	5.3	4.1	11.3	8.8	17.3	13.4
54	11 43.5	11 45.4	11 11.5	5.4	4.2	11.4	8.8	17.4	13.5
55	11 43.8	11 45.7	11 11.7	5.5	4.3	11.5	8.9	17.5	13.6
56	11 44.0	11 45.9	11 11.9	5.6	4.3	11.6	9.0	17.6	13.6
57	11 44.3	11 46.2	11 12.2	5.7	4.4	11.7	9.1	17.7	13.7
58	11 44.5	11 46.4	11 12.4	5.8	4.5	11.8	9.1	17.8	13.8
59	11 44.8	11 46.7	11 12.6	5.9	4.6	11.9	9.2	17.9	13.9
60	11 45.0	11 46.9	11 12.9	6.0	4.7	12.0	9.3	18.0	14.0

m 47	SUN PLANETS	ARIES	MOON	v or d	Corr ⁿ	v or d	Corr ⁿ	v or d	Corr ⁿ
s	o	/	o	/	/	/	/	/	/
00	11 45.0	11 46.9	11 12.9	0.0	0.0	6.0	4.8	12.0	9.5
01	11 45.3	11 47.2	11 13.1	0.1	0.1	6.1	4.8	12.1	9.6
02	11 45.5	11 47.4	11 13.4	0.2	0.2	6.2	4.9	12.2	9.7
03	11 45.8	11 47.7	11 13.6	0.3	0.2	6.3	5.0	12.3	9.7
04	11 46.0	11 47.9	11 13.8	0.4	0.3	6.4	5.1	12.4	9.8
05	11 46.3	11 48.2	11 14.1	0.5	0.4	6.5	5.1	12.5	9.9
06	11 46.5	11 48.4	11 14.3	0.6	0.5	6.6	5.2	12.6	10.0
07	11 46.8	11 48.7	11 14.6	0.7	0.6	6.7	5.3	12.7	10.1
08	11 47.0	11 48.9	11 14.8	0.8	0.6	6.8	5.4	12.8	10.1
09	11 47.3	11 49.2	11 15.0	0.9	0.7	6.9	5.5	12.9	10.2
10	11 47.5	11 49.4	11 15.3	1.0	0.8	7.0	5.5	13.0	10.3
11	11 47.8	11 49.7	11 15.5	1.1	0.9	7.1	5.6	13.1	10.4
12	11 48.0	11 49.9	11 15.7	1.2	1.0	7.2	5.7	13.2	10.5
13	11 48.3	11 50.2	11 16.0	1.3	1.0	7.3	5.8	13.3	10.5
14	11 48.5	11 50.4	11 16.2	1.4	1.1	7.4	5.9	13.4	10.6
15	11 48.8	11 50.7	11 16.5	1.5	1.2	7.5	5.9	13.5	10.7
16	11 49.0	11 50.9	11 16.7	1.6	1.3	7.6	6.0	13.6	10.8
17	11 49.3	11 51.2	11 16.9	1.7	1.3	7.7	6.1	13.7	10.8
18	11 49.5	11 51.4	11 17.2	1.8	1.4	7.8	6.2	13.8	10.9
19	11 49.8	11 51.7	11 17.4	1.9	1.5	7.9	6.3	13.9	11.0
20	11 50.0	11 51.9	11 17.7	2.0	1.6	8.0	6.3	14.0	11.1
21	11 50.3	11 52.2	11 17.9	2.1	1.7	8.1	6.4	14.1	11.2
22	11 50.5	11 52.4	11 18.1	2.2	1.7	8.2	6.5	14.2	11.2
23	11 50.8	11 52.7	11 18.4	2.3	1.8	8.3	6.6	14.3	11.3
24	11 51.0	11 52.9	11 18.6	2.4	1.9	8.4	6.7	14.4	11.4
25	11 51.3	11 53.2	11 18.8	2.5	2.0	8.5	6.7	14.5	11.5
26	11 51.5	11 53.4	11 19.1	2.6	2.1	8.6	6.8	14.6	11.6
27	11 51.8	11 53.7	11 19.3	2.7	2.1	8.7	6.9	14.7	11.6
28	11 52.0	11 53.9	11 19.6	2.8	2.2	8.8	7.0	14.8	11.7
29	11 52.3	11 54.2	11 19.8	2.9	2.3	8.9	7.0	14.9	11.8
30	11 52.5	11 54.5	11 20.0	3.0	2.4	9.0	7.1	15.0	11.9
31	11 52.8	11 54.7	11 20.3	3.1	2.5	9.1	7.2	15.1	12.0
32	11 53.0	11 55.0	11 20.5	3.2	2.5	9.2	7.3	15.2	12.0
33	11 53.3	11 55.2	11 20.8	3.3	2.6	9.3	7.4	15.3	12.1
34	11 53.5	11 55.5	11 21.0	3.4	2.7	9.4	7.4	15.4	12.2
35	11 53.8	11 55.7	11 21.2	3.5	2.8	9.5	7.5	15.5	12.3
36	11 54.0	11 56.0	11 21.5	3.6	2.9	9.6	7.6	15.6	12.4
37	11 54.3	11 56.2	11 21.7	3.7	2.9	9.7	7.7	15.7	12.4
38	11 54.5	11 56.5	11 22.0	3.8	3.0	9.8	7.8	15.8	12.5
39	11 54.8	11 56.7	11 22.2	3.9	3.1	9.9	7.8	15.9	12.6
40	11 55.0	11 57.0	11 22.4	4.0	3.2	10.0	7.9	16.0	12.7
41	11 55.3	11 57.2	11 22.7	4.1	3.2	10.1	8.0	16.1	12.7
42	11 55.5	11 57.5	11 22.9	4.2	3.3	10.2	8.1	16.2	12.8
43	11 55.8	11 57.7	11 23.1	4.3	3.4	10.3	8.2	16.3	12.9
44	11 56.0	11 58.0	11 23.4	4.4	3.5	10.4	8.2	16.4	13.0
45	11 56.3	11 58.2	11 23.6	4.5	3.6	10.5	8.3	16.5	13.1
46	11 56.5	11 58.5	11 23.9	4.6	3.6	10.6	8.4	16.6	13.1
47	11 56.8	11 58.7	11 24.1	4.7	3.7	10.7	8.5	16.7	13.2
48	11 57.0	11 59.0	11 24.3	4.8	3.8	10.8	8.6	16.8	13.3
49	11 57.3	11 59.2	11 24.6	4.9	3.9	10.9	8.6	16.9	13.4
50	11 57.5	11 59.5	11 24.8	5.0	4.0	11.0	8.7	17.0	13.5
51	11 57.8	11 59.7	11 25.1	5.1	4.0	11.1	8.8	17.1	13.5
52	11 58.0	12 00.0	11 25.3	5.2	4.1	11.2	8.9	17.2	13.6
53	11 58.3	12 00.2	11 25.5	5.3	4.2	11.3	8.9	17.3	13.7
54	11 58.5	12 00.5	11 25.8	5.4	4.3	11.4	9.0	17.4	13.8
55	11 58.8	12 00.7	11 26.0	5.5	4.4	11.5	9.1	17.5	13.9
56	11 59.0	12 01.0	11 26.2	5.6	4.4	11.6	9.2	17.6	13.9
57	11 59.3	12 01.2	11 26.5	5.7	4.5	11.7	9.3	17.7	14.0
58	11 59.5	12 01.5	11 26.7	5.8	4.6	11.8	9.3	17.8	14.1
59	11 59.8	12 01.7	11 27.0	5.9	4.7	11.9	9.4	17.9	14.2
60	12 00.0	12 02.0	11 27.2	6.0	4.8	12.0	9.5	18.0	14.3

^m 48	SUN PLANETS	ARIES	MOON	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^m 49	SUN PLANETS	ARIES	MOON	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^v or d	Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /	/ /	/ /	/ /
00	12 00-0	12 02-0	11 27-2	0-0	0-0	6-0	4-9	12-0	9-7	00	12 15-0	12 17-0	11 41-5	0-0	0-0	6-0	5-0	12-0	9-9
01	12 00-3	12 02-2	11 27-4	0-1	0-1	6-1	4-9	12-1	9-8	01	12 15-3	12 17-3	11 41-8	0-1	0-1	6-1	5-0	12-1	10-0
02	12 00-5	12 02-5	11 27-7	0-2	0-2	6-2	5-0	12-2	9-9	02	12 15-5	12 17-5	11 42-0	0-2	0-2	6-2	5-1	12-2	10-1
03	12 00-8	12 02-7	11 27-9	0-3	0-2	6-3	5-1	12-3	9-9	03	12 15-8	12 17-8	11 42-2	0-3	0-2	6-3	5-2	12-3	10-1
04	12 01-0	12 03-0	11 28-2	0-4	0-3	6-4	5-2	12-4	10-0	04	12 16-0	12 18-0	11 42-5	0-4	0-3	6-4	5-3	12-4	10-2
05	12 01-3	12 03-2	11 28-4	0-5	0-4	6-5	5-3	12-5	10-1	05	12 16-3	12 18-3	11 42-7	0-5	0-4	6-5	5-4	12-5	10-3
06	12 01-5	12 03-5	11 28-6	0-6	0-5	6-6	5-3	12-6	10-2	06	12 16-5	12 18-5	11 42-9	0-6	0-5	6-6	5-4	12-6	10-4
07	12 01-8	12 03-7	11 28-9	0-7	0-6	6-7	5-4	12-7	10-3	07	12 16-8	12 18-8	11 43-2	0-7	0-6	6-7	5-5	12-7	10-5
08	12 02-0	12 04-0	11 29-1	0-8	0-6	6-8	5-5	12-8	10-3	08	12 17-0	12 19-0	11 43-4	0-8	0-7	6-8	5-6	12-8	10-6
09	12 02-3	12 04-2	11 29-3	0-9	0-7	6-9	5-6	12-9	10-4	09	12 17-3	12 19-3	11 43-7	0-9	0-7	6-9	5-7	12-9	10-6
10	12 02-5	12 04-5	11 29-6	1-0	0-8	7-0	5-7	13-0	10-5	10	12 17-5	12 19-5	11 43-9	1-0	0-8	7-0	5-8	13-0	10-7
11	12 02-8	12 04-7	11 29-8	1-1	0-9	7-1	5-7	13-1	10-6	11	12 17-8	12 19-8	11 44-1	1-1	0-9	7-1	5-9	13-1	10-8
12	12 03-0	12 05-0	11 30-1	1-2	1-0	7-2	5-8	13-2	10-7	12	12 18-0	12 20-0	11 44-4	1-2	1-0	7-2	5-9	13-2	10-9
13	12 03-3	12 05-2	11 30-3	1-3	1-1	7-3	5-9	13-3	10-8	13	12 18-3	12 20-3	11 44-6	1-3	1-1	7-3	6-0	13-3	11-0
14	12 03-5	12 05-5	11 30-5	1-4	1-1	7-4	6-0	13-4	10-8	14	12 18-5	12 20-5	11 44-9	1-4	1-2	7-4	6-1	13-4	11-1
15	12 03-8	12 05-7	11 30-8	1-5	1-2	7-5	6-1	13-5	10-9	15	12 18-8	12 20-8	11 45-1	1-5	1-2	7-5	6-2	13-5	11-1
16	12 04-0	12 06-0	11 31-0	1-6	1-3	7-6	6-1	13-6	11-0	16	12 19-0	12 21-0	11 45-3	1-6	1-3	7-6	6-3	13-6	11-2
17	12 04-3	12 06-2	11 31-3	1-7	1-4	7-7	6-2	13-7	11-1	17	12 19-3	12 21-3	11 45-6	1-7	1-4	7-7	6-4	13-7	11-3
18	12 04-5	12 06-5	11 31-5	1-8	1-5	7-8	6-3	13-8	11-2	18	12 19-5	12 21-5	11 45-8	1-8	1-5	7-8	6-4	13-8	11-4
19	12 04-8	12 06-7	11 31-7	1-9	1-5	7-9	6-4	13-9	11-2	19	12 19-8	12 21-8	11 46-1	1-9	1-6	7-9	6-5	13-9	11-5
20	12 05-0	12 07-0	11 32-0	2-0	1-6	8-0	6-5	14-0	11-3	20	12 20-0	12 22-0	11 46-3	2-0	1-7	8-0	6-6	14-0	11-6
21	12 05-3	12 07-2	11 32-2	2-1	1-7	8-1	6-5	14-1	11-4	21	12 20-3	12 22-3	11 46-5	2-1	1-7	8-1	6-7	14-1	11-6
22	12 05-5	12 07-5	11 32-4	2-2	1-8	8-2	6-6	14-2	11-5	22	12 20-5	12 22-5	11 46-8	2-2	1-8	8-2	6-8	14-2	11-7
23	12 05-8	12 07-7	11 32-7	2-3	1-9	8-3	6-7	14-3	11-6	23	12 20-8	12 22-8	11 47-0	2-3	1-9	8-3	6-8	14-3	11-8
24	12 06-0	12 08-0	11 32-9	2-4	1-9	8-4	6-8	14-4	11-6	24	12 21-0	12 23-0	11 47-2	2-4	2-0	8-4	6-9	14-4	11-9
25	12 06-3	12 08-2	11 33-2	2-5	2-0	8-5	6-9	14-5	11-7	25	12 21-3	12 23-3	11 47-5	2-5	2-1	8-5	7-0	14-5	12-0
26	12 06-5	12 08-5	11 33-4	2-6	2-1	8-6	7-0	14-6	11-8	26	12 21-5	12 23-5	11 47-7	2-6	2-1	8-6	7-1	14-6	12-0
27	12 06-8	12 08-7	11 33-6	2-7	2-2	8-7	7-0	14-7	11-9	27	12 21-8	12 23-8	11 48-0	2-7	2-2	8-7	7-2	14-7	12-1
28	12 07-0	12 09-0	11 33-9	2-8	2-3	8-8	7-1	14-8	12-0	28	12 22-0	12 24-0	11 48-2	2-8	2-3	8-8	7-3	14-8	12-2
29	12 07-3	12 09-2	11 34-1	2-9	2-3	8-9	7-2	14-9	12-0	29	12 22-3	12 24-3	11 48-4	2-9	2-4	8-9	7-3	14-9	12-3
30	12 07-5	12 09-5	11 34-4	3-0	2-4	9-0	7-3	15-0	12-1	30	12 22-5	12 24-5	11 48-7	3-0	2-5	9-0	7-4	15-0	12-4
31	12 07-8	12 09-7	11 34-6	3-1	2-5	9-1	7-4	15-1	12-2	31	12 22-8	12 24-8	11 48-9	3-1	2-6	9-1	7-5	15-1	12-5
32	12 08-0	12 10-0	11 34-8	3-2	2-6	9-2	7-4	15-2	12-3	32	12 23-0	12 25-0	11 49-2	3-2	2-6	9-2	7-6	15-2	12-5
33	12 08-3	12 10-2	11 35-1	3-3	2-7	9-3	7-5	15-3	12-4	33	12 23-3	12 25-3	11 49-4	3-3	2-7	9-3	7-7	15-3	12-6
34	12 08-5	12 10-5	11 35-3	3-4	2-7	9-4	7-6	15-4	12-4	34	12 23-5	12 25-5	11 49-6	3-4	2-8	9-4	7-8	15-4	12-7
35	12 08-8	12 10-7	11 35-6	3-5	2-8	9-5	7-7	15-5	12-5	35	12 23-8	12 25-8	11 49-9	3-5	2-9	9-5	7-8	15-5	12-8
36	12 09-0	12 11-0	11 35-8	3-6	2-9	9-6	7-8	15-6	12-6	36	12 24-0	12 26-0	11 50-1	3-6	3-0	9-6	7-9	15-6	12-9
37	12 09-3	12 11-2	11 36-0	3-7	3-0	9-7	7-8	15-7	12-7	37	12 24-3	12 26-3	11 50-3	3-7	3-1	9-7	8-0	15-7	13-0
38	12 09-5	12 11-5	11 36-3	3-8	3-1	9-8	7-9	15-8	12-8	38	12 24-5	12 26-5	11 50-6	3-8	3-1	9-8	8-1	15-8	13-0
39	12 09-8	12 11-7	11 36-5	3-9	3-2	9-9	8-0	15-9	12-9	39	12 24-8	12 26-8	11 50-8	3-9	3-2	9-9	8-2	15-9	13-1
40	12 10-0	12 12-0	11 36-7	4-0	3-2	10-0	8-1	16-0	12-9	40	12 25-0	12 27-0	11 51-1	4-0	3-3	10-0	8-3	16-0	13-2
41	12 10-3	12 12-2	11 37-0	4-1	3-3	10-1	8-2	16-1	13-0	41	12 25-3	12 27-3	11 51-3	4-1	3-4	10-1	8-3	16-1	13-3
42	12 10-5	12 12-5	11 37-2	4-2	3-4	10-2	8-2	16-2	13-1	42	12 25-5	12 27-5	11 51-5	4-2	3-5	10-2	8-4	16-2	13-4
43	12 10-8	12 12-8	11 37-5	4-3	3-5	10-3	8-3	16-3	13-2	43	12 25-8	12 27-8	11 51-8	4-3	3-5	10-3	8-5	16-3	13-4
44	12 11-0	12 13-0	11 37-7	4-4	3-6	10-4	8-4	16-4	13-3	44	12 26-0	12 28-0	11 52-0	4-4	3-6	10-4	8-6	16-4	13-5
45	12 11-3	12 13-3	11 37-9	4-5	3-6	10-5	8-5	16-5	13-3	45	12 26-3	12 28-3	11 52-3	4-5	3-7	10-5	8-7	16-5	13-6
46	12 11-5	12 13-5	11 38-2	4-6	3-7	10-6	8-6	16-6	13-4	46	12 26-5	12 28-5	11 52-5	4-6	3-8	10-6	8-7	16-6	13-7
47	12 11-8	12 13-8	11 38-4	4-7	3-8	10-7	8-6	16-7	13-5	47	12 26-8	12 28-8	11 52-7	4-7	3-9	10-7	8-8	16-7	13-8
48	12 12-0	12 14-0	11 38-7	4-8	3-9	10-8	8-7	16-8	13-6	48	12 27-0	12 29-0	11 53-0	4-8	4-0	10-8	8-9	16-8	13-9
49	12 12-3	12 14-3	11 38-9	4-9	4-0	10-9	8-8	16-9	13-7	49	12 27-3	12 29-3	11 53-2	4-9	4-0	10-9	9-0	16-9	13-9
50	12 12-5	12 14-5	11 39-1	5-0	4-0	11-0	8-9	17-0	13-7	50	12 27-5	12 29-5	11 53-4	5-0	4-1	11-0	9-1	17-0	14-0
51	12 12-8	12 14-8	11 39-4	5-1	4-1	11-1	9-0	17-1	13-8	51	12 27-8	12 29-8	11 53-7	5-1	4-2	11-1	9-2	17-1	14-1
52	12 13-0	12 15-0	11 39-6	5-2	4-2	11-2	9-1	17-2	13-9	52	12 28-0	12 30-0	11 53-9	5-2	4-3	11-2	9-2	17-2	14-2
53	12 13-3	12 15-3	11 39-8	5-3	4-3	11-3	9-1	17-3	14-0	53	12 28-3	12 30-3	11 54-2	5-3	4-4	11-3	9-3	17-3	14-3
54	12 13-5	12 15-5	11 40-1	5-4	4-4	11-4	9-2	17-4	14-1	54	12 28-5	12 30-5	11 54-4	5-4	4-5	11-4	9-4	17-4	14-4
55	12 13-8	12 15-8	11 40-3	5-5	4-4	11-5	9-3	17-5	14-1	55	12 28-8	12 30-8	11 54-6	5-5	4-5	11-5	9-5	17-5	14-4
56	12 14-0	12 16-0	11 40-6	5-6	4-5	11-6	9-4	17-6	14-2	56	12 29-0	12 31-1	11 54-9	5-6	4-6	11-6	9-6	17-6	14-5
57	12 14-3	12 16-3	11 40-8	5-7	4-6	11-7	9-5	17-7	14-3	57	12 29-3	12 31-3	11 55-1	5-7	4-7	11-7	9-7	17-7	14-6
58	12 14-5	12 16-5	11 41-0	5-8	4-7	11-8	9-5	17-8	14-4	58	12 29-5	12 31-6	11 55-4	5-8	4-8	11-8	9-7	17-8	14-7
59	12 14-8	12 16-8	11 41-3	5-9	4-8	11-9	9-6	17-9	14-5	59	12 29-8	12 31-8	11 55-6	5-9	4-9	11-9	9-8	17-9	14-8
60	12 15-0	12 17-0	11 41-5	6-0	4-9	12-0	9-7	18-0	14-6	60	12 30-0	12 32-1	11 55-8	6-0	5-0	12-0	9-9	18-0	14-9

^m 50	SUN PLANETS	ARIES	MOON	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^v or d	Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	/ /	/ /	/ /
00	12 30.0	12 32.1	11 55.8	0.0	0.0	6.0	5.1	12.0	10.1
01	12 30.3	12 32.3	11 56.1	0.1	0.1	6.1	5.1	12.1	10.2
02	12 30.5	12 32.6	11 56.3	0.2	0.2	6.2	5.2	12.2	10.3
03	12 30.8	12 32.8	11 56.5	0.3	0.3	6.3	5.3	12.3	10.4
04	12 31.0	12 33.1	11 56.8	0.4	0.3	6.4	5.4	12.4	10.4
05	12 31.3	12 33.3	11 57.0	0.5	0.4	6.5	5.5	12.5	10.5
06	12 31.5	12 33.6	11 57.3	0.6	0.5	6.6	5.6	12.6	10.6
07	12 31.8	12 33.8	11 57.5	0.7	0.6	6.7	5.6	12.7	10.7
08	12 32.0	12 34.1	11 57.7	0.8	0.7	6.8	5.7	12.8	10.8
09	12 32.3	12 34.3	11 58.0	0.9	0.8	6.9	5.8	12.9	10.9
10	12 32.5	12 34.6	11 58.2	1.0	0.8	7.0	5.9	13.0	10.9
11	12 32.8	12 34.8	11 58.5	1.1	0.9	7.1	6.0	13.1	11.0
12	12 33.0	12 35.1	11 58.7	1.2	1.0	7.2	6.1	13.2	11.1
13	12 33.3	12 35.3	11 58.9	1.3	1.1	7.3	6.1	13.3	11.2
14	12 33.5	12 35.6	11 59.2	1.4	1.2	7.4	6.2	13.4	11.3
15	12 33.8	12 35.8	11 59.4	1.5	1.3	7.5	6.3	13.5	11.4
16	12 34.0	12 36.1	11 59.7	1.6	1.3	7.6	6.4	13.6	11.4
17	12 34.3	12 36.3	11 59.9	1.7	1.4	7.7	6.5	13.7	11.5
18	12 34.5	12 36.6	12 00.1	1.8	1.5	7.8	6.6	13.8	11.6
19	12 34.8	12 36.8	12 00.4	1.9	1.6	7.9	6.6	13.9	11.7
20	12 35.0	12 37.1	12 00.6	2.0	1.7	8.0	6.7	14.0	11.8
21	12 35.3	12 37.3	12 00.8	2.1	1.8	8.1	6.8	14.1	11.9
22	12 35.5	12 37.6	12 01.1	2.2	1.9	8.2	6.9	14.2	12.0
23	12 35.8	12 37.8	12 01.3	2.3	1.9	8.3	7.0	14.3	12.0
24	12 36.0	12 38.1	12 01.6	2.4	2.0	8.4	7.1	14.4	12.1
25	12 36.3	12 38.3	12 01.8	2.5	2.1	8.5	7.2	14.5	12.2
26	12 36.5	12 38.6	12 02.0	2.6	2.2	8.6	7.2	14.6	12.3
27	12 36.8	12 38.8	12 02.3	2.7	2.3	8.7	7.3	14.7	12.4
28	12 37.0	12 39.1	12 02.5	2.8	2.4	8.8	7.4	14.8	12.5
29	12 37.3	12 39.3	12 02.8	2.9	2.4	8.9	7.5	14.9	12.5
30	12 37.5	12 39.6	12 03.0	3.0	2.5	9.0	7.6	15.0	12.6
31	12 37.8	12 39.8	12 03.2	3.1	2.6	9.1	7.7	15.1	12.7
32	12 38.0	12 40.1	12 03.5	3.2	2.7	9.2	7.7	15.2	12.8
33	12 38.3	12 40.3	12 03.7	3.3	2.8	9.3	7.8	15.3	12.9
34	12 38.5	12 40.6	12 03.9	3.4	2.9	9.4	7.9	15.4	13.0
35	12 38.8	12 40.8	12 04.2	3.5	2.9	9.5	8.0	15.5	13.0
36	12 39.0	12 41.1	12 04.4	3.6	3.0	9.6	8.1	15.6	13.1
37	12 39.3	12 41.3	12 04.7	3.7	3.1	9.7	8.2	15.7	13.2
38	12 39.5	12 41.6	12 04.9	3.8	3.2	9.8	8.2	15.8	13.3
39	12 39.8	12 41.8	12 05.1	3.9	3.3	9.9	8.3	15.9	13.4
40	12 40.0	12 42.1	12 05.4	4.0	3.4	10.0	8.4	16.0	13.5
41	12 40.3	12 42.3	12 05.6	4.1	3.5	10.1	8.5	16.1	13.6
42	12 40.5	12 42.6	12 05.9	4.2	3.5	10.2	8.6	16.2	13.6
43	12 40.8	12 42.8	12 06.1	4.3	3.6	10.3	8.7	16.3	13.7
44	12 41.0	12 43.1	12 06.3	4.4	3.7	10.4	8.8	16.4	13.8
45	12 41.3	12 43.3	12 06.6	4.5	3.8	10.5	8.8	16.5	13.9
46	12 41.5	12 43.6	12 06.8	4.6	3.9	10.6	8.9	16.6	14.0
47	12 41.8	12 43.8	12 07.0	4.7	4.0	10.7	9.0	16.7	14.1
48	12 42.0	12 44.1	12 07.3	4.8	4.0	10.8	9.1	16.8	14.1
49	12 42.3	12 44.3	12 07.5	4.9	4.1	10.9	9.2	16.9	14.2
50	12 42.5	12 44.6	12 07.8	5.0	4.2	11.0	9.3	17.0	14.3
51	12 42.8	12 44.8	12 08.0	5.1	4.3	11.1	9.3	17.1	14.4
52	12 43.0	12 45.1	12 08.2	5.2	4.4	11.2	9.4	17.2	14.5
53	12 43.3	12 45.3	12 08.5	5.3	4.5	11.3	9.5	17.3	14.6
54	12 43.5	12 45.6	12 08.7	5.4	4.5	11.4	9.6	17.4	14.6
55	12 43.8	12 45.8	12 09.0	5.5	4.6	11.5	9.7	17.5	14.7
56	12 44.0	12 46.1	12 09.2	5.6	4.7	11.6	9.8	17.6	14.8
57	12 44.3	12 46.3	12 09.4	5.7	4.8	11.7	9.8	17.7	14.9
58	12 44.5	12 46.6	12 09.7	5.8	4.9	11.8	9.9	17.8	15.0
59	12 44.8	12 46.8	12 09.9	5.9	5.0	11.9	10.0	17.9	15.1
60	12 45.0	12 47.1	12 10.2	6.0	5.1	12.0	10.1	18.0	15.2

^m 51	SUN PLANETS	ARIES	MOON	^v or d	Corr ⁿ	^v or d	Corr ⁿ	^v or d	Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	/ /	/ /	/ /
00	12 45.0	12 47.1	12 10.2	0.0	0.0	6.0	5.2	12.0	10.3
01	12 45.3	12 47.3	12 10.4	0.1	0.1	6.1	5.2	12.1	10.4
02	12 45.5	12 47.6	12 10.6	0.2	0.2	6.2	5.3	12.2	10.5
03	12 45.8	12 47.8	12 10.9	0.3	0.3	6.3	5.4	12.3	10.6
04	12 46.0	12 48.1	12 11.1	0.4	0.3	6.4	5.5	12.4	10.6
05	12 46.3	12 48.3	12 11.3	0.5	0.4	6.5	5.6	12.5	10.7
06	12 46.5	12 48.6	12 11.6	0.6	0.5	6.6	5.7	12.6	10.8
07	12 46.8	12 48.8	12 11.8	0.7	0.6	6.7	5.8	12.7	10.9
08	12 47.0	12 49.1	12 12.1	0.8	0.7	6.8	5.8	12.8	11.0
09	12 47.3	12 49.4	12 12.3	0.9	0.8	6.9	5.9	12.9	11.1
10	12 47.5	12 49.6	12 12.5	1.0	0.9	7.0	6.0	13.0	11.2
11	12 47.8	12 49.9	12 12.8	1.1	0.9	7.1	6.1	13.1	11.2
12	12 48.0	12 50.1	12 13.0	1.2	1.0	7.2	6.2	13.2	11.3
13	12 48.3	12 50.4	12 13.3	1.3	1.1	7.3	6.3	13.3	11.4
14	12 48.5	12 50.6	12 13.5	1.4	1.2	7.4	6.4	13.4	11.5
15	12 48.8	12 50.9	12 13.7	1.5	1.3	7.5	6.4	13.5	11.6
16	12 49.0	12 51.1	12 14.0	1.6	1.4	7.6	6.5	13.6	11.7
17	12 49.3	12 51.4	12 14.2	1.7	1.5	7.7	6.6	13.7	11.8
18	12 49.5	12 51.6	12 14.4	1.8	1.5	7.8	6.7	13.8	11.8
19	12 49.8	12 51.9	12 14.7	1.9	1.6	7.9	6.8	13.9	11.9
20	12 50.0	12 52.1	12 14.9	2.0	1.7	8.0	6.9	14.0	12.0
21	12 50.3	12 52.4	12 15.2	2.1	1.8	8.1	7.0	14.1	12.1
22	12 50.5	12 52.6	12 15.4	2.2	1.9	8.2	7.0	14.2	12.2
23	12 50.8	12 52.9	12 15.6	2.3	2.0	8.3	7.1	14.3	12.3
24	12 51.0	12 53.1	12 15.9	2.4	2.1	8.4	7.2	14.4	12.4
25	12 51.3	12 53.4	12 16.1	2.5	2.1	8.5	7.3	14.5	12.4
26	12 51.5	12 53.6	12 16.4	2.6	2.2	8.6	7.4	14.6	12.5
27	12 51.8	12 53.9	12 16.6	2.7	2.3	8.7	7.5	14.7	12.6
28	12 52.0	12 54.1	12 16.8	2.8	2.4	8.8	7.6	14.8	12.7
29	12 52.3	12 54.4	12 17.1	2.9	2.5	8.9	7.6	14.9	12.8
30	12 52.5	12 54.6	12 17.3	3.0	2.6	9.0	7.7	15.0	12.9
31	12 52.8	12 54.9	12 17.5	3.1	2.7	9.1	7.8	15.1	13.0
32	12 53.0	12 55.1	12 17.8	3.2	2.7	9.2	7.9	15.2	13.0
33	12 53.3	12 55.4	12 18.0	3.3	2.8	9.3	8.0	15.3	13.1
34	12 53.5	12 55.6	12 18.3	3.4	2.9	9.4	8.1	15.4	13.2
35	12 53.8	12 55.9	12 18.5	3.5	3.0	9.5	8.2	15.5	13.3
36	12 54.0	12 56.1	12 18.7	3.6	3.1	9.6	8.2	15.6	13.4
37	12 54.3	12 56.4	12 19.0	3.7	3.2	9.7	8.3	15.7	13.5
38	12 54.5	12 56.6	12 19.2	3.8	3.3	9.8	8.4	15.8	13.6
39	12 54.8	12 56.9	12 19.5	3.9	3.3	9.9	8.5	15.9	13.6
40	12 55.0	12 57.1	12 19.7	4.0	3.4	10.0	8.6	16.0	13.7
41	12 55.3	12 57.4	12 19.9	4.1	3.5	10.1	8.7	16.1	13.8
42	12 55.5	12 57.6	12 20.2	4.2	3.6	10.2	8.8	16.2	13.9
43	12 55.8	12 57.9	12 20.4	4.3	3.7	10.3	8.8	16.3	14.0
44	12 56.0	12 58.1	12 20.6	4.4	3.8	10.4	8.9	16.4	14.1
45	12 56.3	12 58.4	12 20.9	4.5	3.9	10.5	9.0	16.5	14.2
46	12 56.5	12 58.6	12 21.1	4.6	3.9	10.6	9.1	16.6	14.2
47	12 56.8	12 58.9	12 21.4	4.7	4.0	10.7	9.2	16.7	14.3
48	12 57.0	12 59.1	12 21.6	4.8	4.1	10.8	9.3	16.8	14.4
49	12 57.3	12 59.4	12 21.8	4.9	4.2	10.9	9.4	16.9	14.5
50	12 57.5	12 59.6	12 22.1	5.0	4.3	11.0	9.4	17.0	14.6
51	12 57.8	12 59.9	12 22.3	5.1	4.4	11.1	9.5	17.1	14.7
52	12 58.0	13 00.1	12 22.6	5.2	4.5	11.2	9.6	17.2	14.8
53	12 58.3	13 00.4	12 22.8	5.3	4.5	11.3	9.7	17.3	14.8
54	12 58.5	13 00.6	12 23.0	5.4	4.6	11.4	9.8	17.4	14.9
55	12 58.8	13 00.9	12 23.3	5.5	4.7	11.5	9.9	17.5	15.0
56	12 59.0	13 01.1	12 23.5	5.6	4.8	11.6	10.0	17.6	15.1
57	12 59.3	13 01.4	12 23.8	5.7	4.9	11.7	10.0	17.7	15.2
58	12 59.5	13 01.6	12 24.0	5.8	5.0	11.8	10.1	17.8	15.3
59	12 59.8	13 01.9	12 24.2	5.9	5.1	11.9	10.2	17.9	15.4
60	13 00.0	13 02.1	12 24.5	6.0	5.2	12.0	10.3	18.0	15.5

^m 52	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	13 00-0	13 02-1	12 24-5	0-0 0-0	6-0 5-3	12-0 10-5
01	13 00-3	13 02-4	12 24-7	0-1 0-1	6-1 5-3	12-1 10-6
02	13 00-5	13 02-6	12 24-9	0-2 0-2	6-2 5-4	12-2 10-7
03	13 00-8	13 02-9	12 25-2	0-3 0-3	6-3 5-5	12-3 10-8
04	13 01-0	13 03-1	12 25-4	0-4 0-4	6-4 5-6	12-4 10-9
05	13 01-3	13 03-4	12 25-7	0-5 0-4	6-5 5-7	12-5 10-9
06	13 01-5	13 03-6	12 25-9	0-6 0-5	6-6 5-8	12-6 11-0
07	13 01-8	13 03-9	12 26-1	0-7 0-6	6-7 5-9	12-7 11-1
08	13 02-0	13 04-1	12 26-4	0-8 0-7	6-8 6-0	12-8 11-2
09	13 02-3	13 04-4	12 26-6	0-9 0-8	6-9 6-0	12-9 11-3
10	13 02-5	13 04-6	12 26-9	1-0 0-9	7-0 6-1	13-0 11-4
11	13 02-8	13 04-9	12 27-1	1-1 1-0	7-1 6-2	13-1 11-5
12	13 03-0	13 05-1	12 27-3	1-2 1-1	7-2 6-3	13-2 11-6
13	13 03-3	13 05-4	12 27-6	1-3 1-1	7-3 6-4	13-3 11-6
14	13 03-5	13 05-6	12 27-8	1-4 1-2	7-4 6-5	13-4 11-7
15	13 03-8	13 05-9	12 28-0	1-5 1-3	7-5 6-6	13-5 11-8
16	13 04-0	13 06-1	12 28-3	1-6 1-4	7-6 6-7	13-6 11-9
17	13 04-3	13 06-4	12 28-5	1-7 1-5	7-7 6-7	13-7 12-0
18	13 04-5	13 06-6	12 28-8	1-8 1-6	7-8 6-8	13-8 12-1
19	13 04-8	13 06-9	12 29-0	1-9 1-7	7-9 6-9	13-9 12-2
20	13 05-0	13 07-1	12 29-2	2-0 1-8	8-0 7-0	14-0 12-3
21	13 05-3	13 07-4	12 29-5	2-1 1-8	8-1 7-1	14-1 12-3
22	13 05-5	13 07-7	12 29-7	2-2 1-9	8-2 7-2	14-2 12-4
23	13 05-8	13 07-9	12 30-0	2-3 2-0	8-3 7-3	14-3 12-5
24	13 06-0	13 08-2	12 30-2	2-4 2-1	8-4 7-4	14-4 12-6
25	13 06-3	13 08-4	12 30-4	2-5 2-2	8-5 7-4	14-5 12-7
26	13 06-5	13 08-7	12 30-7	2-6 2-3	8-6 7-5	14-6 12-8
27	13 06-8	13 08-9	12 30-9	2-7 2-4	8-7 7-6	14-7 12-9
28	13 07-0	13 09-2	12 31-1	2-8 2-5	8-8 7-7	14-8 13-0
29	13 07-3	13 09-4	12 31-4	2-9 2-5	8-9 7-8	14-9 13-0
30	13 07-5	13 09-7	12 31-6	3-0 2-6	9-0 7-9	15-0 13-1
31	13 07-8	13 09-9	12 31-9	3-1 2-7	9-1 8-0	15-1 13-2
32	13 08-0	13 10-2	12 32-1	3-2 2-8	9-2 8-0	15-2 13-3
33	13 08-3	13 10-4	12 32-3	3-3 2-9	9-3 8-1	15-3 13-4
34	13 08-5	13 10-7	12 32-6	3-4 3-0	9-4 8-2	15-4 13-5
35	13 08-8	13 10-9	12 32-8	3-5 3-1	9-5 8-3	15-5 13-6
36	13 09-0	13 11-2	12 33-1	3-6 3-2	9-6 8-4	15-6 13-7
37	13 09-3	13 11-4	12 33-3	3-7 3-2	9-7 8-5	15-7 13-7
38	13 09-5	13 11-7	12 33-5	3-8 3-3	9-8 8-6	15-8 13-8
39	13 09-8	13 11-9	12 33-8	3-9 3-4	9-9 8-7	15-9 13-9
40	13 10-0	13 12-2	12 34-0	4-0 3-5	10-0 8-8	16-0 14-0
41	13 10-3	13 12-4	12 34-2	4-1 3-6	10-1 8-8	16-1 14-1
42	13 10-5	13 12-7	12 34-5	4-2 3-7	10-2 8-9	16-2 14-2
43	13 10-8	13 12-9	12 34-7	4-3 3-8	10-3 9-0	16-3 14-3
44	13 11-0	13 13-2	12 35-0	4-4 3-9	10-4 9-1	16-4 14-3
45	13 11-3	13 13-4	12 35-2	4-5 3-9	10-5 9-2	16-5 14-4
46	13 11-5	13 13-7	12 35-4	4-6 4-0	10-6 9-3	16-6 14-5
47	13 11-8	13 13-9	12 35-7	4-7 4-1	10-7 9-4	16-7 14-6
48	13 12-0	13 14-2	12 35-9	4-8 4-2	10-8 9-5	16-8 14-7
49	13 12-3	13 14-4	12 36-2	4-9 4-3	10-9 9-5	16-9 14-8
50	13 12-5	13 14-7	12 36-4	5-0 4-4	11-0 9-6	17-0 14-9
51	13 12-8	13 14-9	12 36-6	5-1 4-5	11-1 9-7	17-1 15-0
52	13 13-0	13 15-2	12 36-9	5-2 4-6	11-2 9-8	17-2 15-1
53	13 13-3	13 15-4	12 37-1	5-3 4-6	11-3 9-9	17-3 15-1
54	13 13-5	13 15-7	12 37-4	5-4 4-7	11-4 10-0	17-4 15-2
55	13 13-8	13 15-9	12 37-6	5-5 4-8	11-5 10-1	17-5 15-3
56	13 14-0	13 16-2	12 37-8	5-6 4-9	11-6 10-2	17-6 15-4
57	13 14-3	13 16-4	12 38-1	5-7 5-0	11-7 10-2	17-7 15-5
58	13 14-5	13 16-7	12 38-3	5-8 5-1	11-8 10-3	17-8 15-6
59	13 14-8	13 16-9	12 38-5	5-9 5-2	11-9 10-4	17-9 15-7
60	13 15-0	13 17-2	12 38-8	6-0 5-3	12-0 10-5	18-0 15-8

^m 53	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ	$\frac{v}{d}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /
00	13 15-0	13 17-2	12 38-8	0-0 0-0	6-0 5-4	12-0 10-7
01	13 15-3	13 17-4	12 39-0	0-1 0-1	6-1 5-4	12-1 10-8
02	13 15-5	13 17-7	12 39-3	0-2 0-2	6-2 5-5	12-2 10-9
03	13 15-8	13 17-9	12 39-5	0-3 0-3	6-3 5-6	12-3 11-0
04	13 16-0	13 18-2	12 39-7	0-4 0-4	6-4 5-7	12-4 11-1
05	13 16-3	13 18-4	12 40-0	0-5 0-4	6-5 5-8	12-5 11-1
06	13 16-5	13 18-7	12 40-2	0-6 0-5	6-6 5-9	12-6 11-2
07	13 16-8	13 18-9	12 40-5	0-7 0-6	6-7 6-0	12-7 11-3
08	13 17-0	13 19-2	12 40-7	0-8 0-7	6-8 6-1	12-8 11-4
09	13 17-3	13 19-4	12 40-9	0-9 0-8	6-9 6-2	12-9 11-5
10	13 17-5	13 19-7	12 41-2	1-0 0-9	7-0 6-2	13-0 11-6
11	13 17-8	13 19-9	12 41-4	1-1 1-0	7-1 6-3	13-1 11-7
12	13 18-0	13 20-2	12 41-6	1-2 1-1	7-2 6-4	13-2 11-8
13	13 18-3	13 20-4	12 41-9	1-3 1-2	7-3 6-5	13-3 11-9
14	13 18-5	13 20-7	12 42-1	1-4 1-2	7-4 6-6	13-4 11-9
15	13 18-8	13 20-9	12 42-4	1-5 1-3	7-5 6-7	13-5 12-0
16	13 19-0	13 21-2	12 42-6	1-6 1-4	7-6 6-8	13-6 12-1
17	13 19-3	13 21-4	12 42-8	1-7 1-5	7-7 6-9	13-7 12-2
18	13 19-5	13 21-7	12 43-1	1-8 1-6	7-8 7-0	13-8 12-3
19	13 19-8	13 21-9	12 43-3	1-9 1-7	7-9 7-0	13-9 12-4
20	13 20-0	13 22-2	12 43-6	2-0 1-8	8-0 7-1	14-0 12-5
21	13 20-3	13 22-4	12 43-8	2-1 1-9	8-1 7-2	14-1 12-6
22	13 20-5	13 22-7	12 44-0	2-2 2-0	8-2 7-3	14-2 12-7
23	13 20-8	13 22-9	12 44-3	2-3 2-1	8-3 7-4	14-3 12-8
24	13 21-0	13 23-2	12 44-5	2-4 2-1	8-4 7-5	14-4 12-8
25	13 21-3	13 23-4	12 44-7	2-5 2-2	8-5 7-6	14-5 12-9
26	13 21-5	13 23-7	12 45-0	2-6 2-3	8-6 7-7	14-6 13-0
27	13 21-8	13 23-9	12 45-2	2-7 2-4	8-7 7-8	14-7 13-1
28	13 22-0	13 24-2	12 45-5	2-8 2-5	8-8 7-8	14-8 13-2
29	13 22-3	13 24-4	12 45-7	2-9 2-6	8-9 7-9	14-9 13-3
30	13 22-5	13 24-7	12 45-9	3-0 2-7	9-0 8-0	15-0 13-4
31	13 22-8	13 24-9	12 46-2	3-1 2-8	9-1 8-1	15-1 13-5
32	13 23-0	13 25-2	12 46-4	3-2 2-9	9-2 8-2	15-2 13-6
33	13 23-3	13 25-4	12 46-7	3-3 2-9	9-3 8-3	15-3 13-6
34	13 23-5	13 25-7	12 46-9	3-4 3-0	9-4 8-4	15-4 13-7
35	13 23-8	13 26-0	12 47-1	3-5 3-1	9-5 8-5	15-5 13-8
36	13 24-0	13 26-2	12 47-4	3-6 3-2	9-6 8-6	15-6 13-9
37	13 24-3	13 26-5	12 47-6	3-7 3-3	9-7 8-6	15-7 14-0
38	13 24-5	13 26-7	12 47-9	3-8 3-4	9-8 8-7	15-8 14-1
39	13 24-8	13 27-0	12 48-1	3-9 3-5	9-9 8-8	15-9 14-2
40	13 25-0	13 27-2	12 48-3	4-0 3-6	10-0 8-9	16-0 14-3
41	13 25-3	13 27-5	12 48-6	4-1 3-7	10-1 9-0	16-1 14-4
42	13 25-5	13 27-7	12 48-8	4-2 3-7	10-2 9-1	16-2 14-4
43	13 25-8	13 28-0	12 49-0	4-3 3-8	10-3 9-2	16-3 14-5
44	13 26-0	13 28-2	12 49-3	4-4 3-9	10-4 9-3	16-4 14-6
45	13 26-3	13 28-5	12 49-5	4-5 4-0	10-5 9-4	16-5 14-7
46	13 26-5	13 28-7	12 49-8	4-6 4-1	10-6 9-5	16-6 14-8
47	13 26-8	13 29-0	12 50-0	4-7 4-2	10-7 9-5	16-7 14-9
48	13 27-0	13 29-2	12 50-2	4-8 4-3	10-8 9-6	16-8 15-0
49	13 27-3	13 29-5	12 50-5	4-9 4-4	10-9 9-7	16-9 15-1
50	13 27-5	13 29-7	12 50-7	5-0 4-5	11-0 9-8	17-0 15-2
51	13 27-8	13 30-0	12 51-0	5-1 4-5	11-1 9-9	17-1 15-2
52	13 28-0	13 30-2	12 51-2	5-2 4-6	11-2 10-0	17-2 15-3
53	13 28-3	13 30-5	12 51-4	5-3 4-7	11-3 10-1	17-3 15-4
54	13 28-5	13 30-7	12 51-7	5-4 4-8	11-4 10-2	17-4 15-5
55	13 28-8	13 31-0	12 51-9	5-5 4-9	11-5 10-3	17-5 15-6
56	13 29-0	13 31-2	12 52-1	5-6 5-0	11-6 10-3	17-6 15-7
57	13 29-3	13 31-5	12 52-4	5-7 5-1	11-7 10-4	17-7 15-8
58	13 29-5	13 31-7	12 52-6	5-8 5-2	11-8 10-5	17-8 15-9
59	13 29-8	13 32-0	12 52-9	5-9 5-3	11-9 10-6	17-9 16-0
60	13 30-0	13 32-2	12 53-1	6-0 5-4	12-0 10-7	18-0 16-1

^m 54	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	^m 55	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	s	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
00	13 30.0	13 32.2	12 53.1	0.0 0.0	6.0 5.5	12.0 10.9	00	13 45.0	13 47.3	13 07.4	0.0 0.0	6.0 5.6	12.0 11.1
01	13 30.3	13 32.5	12 53.3	0.1 0.1	6.1 5.5	12.1 11.0	01	13 45.3	13 47.5	13 07.7	0.1 0.1	6.1 5.6	12.1 11.2
02	13 30.5	13 32.7	12 53.6	0.2 0.2	6.2 5.6	12.2 11.1	02	13 45.5	13 47.8	13 07.9	0.2 0.2	6.2 5.7	12.2 11.3
03	13 30.8	13 33.0	12 53.8	0.3 0.3	6.3 5.7	12.3 11.2	03	13 45.8	13 48.0	13 08.1	0.3 0.3	6.3 5.8	12.3 11.4
04	13 31.0	13 33.2	12 54.1	0.4 0.4	6.4 5.8	12.4 11.3	04	13 46.0	13 48.3	13 08.4	0.4 0.4	6.4 5.9	12.4 11.5
05	13 31.3	13 33.5	12 54.3	0.5 0.5	6.5 5.9	12.5 11.4	05	13 46.3	13 48.5	13 08.6	0.5 0.5	6.5 6.0	12.5 11.6
06	13 31.5	13 33.7	12 54.5	0.6 0.6	6.6 6.0	12.6 11.4	06	13 46.5	13 48.8	13 08.8	0.6 0.6	6.6 6.1	12.6 11.7
07	13 31.8	13 34.0	12 54.8	0.7 0.6	6.7 6.1	12.7 11.5	07	13 46.8	13 49.0	13 09.1	0.7 0.6	6.7 6.2	12.7 11.7
08	13 32.0	13 34.2	12 55.0	0.8 0.7	6.8 6.2	12.8 11.6	08	13 47.0	13 49.3	13 09.3	0.8 0.7	6.8 6.3	12.8 11.8
09	13 32.3	13 34.5	12 55.2	0.9 0.8	6.9 6.3	12.9 11.7	09	13 47.3	13 49.5	13 09.6	0.9 0.8	6.9 6.4	12.9 11.9
10	13 32.5	13 34.7	12 55.5	1.0 0.9	7.0 6.4	13.0 11.8	10	13 47.5	13 49.8	13 09.8	1.0 0.9	7.0 6.5	13.0 12.0
11	13 32.8	13 35.0	12 55.7	1.1 1.0	7.1 6.4	13.1 11.9	11	13 47.8	13 50.0	13 10.0	1.1 1.0	7.1 6.6	13.1 12.1
12	13 33.0	13 35.2	12 56.0	1.2 1.1	7.2 6.5	13.2 12.0	12	13 48.0	13 50.3	13 10.3	1.2 1.1	7.2 6.7	13.2 12.2
13	13 33.3	13 35.5	12 56.2	1.3 1.2	7.3 6.6	13.3 12.1	13	13 48.3	13 50.5	13 10.5	1.3 1.2	7.3 6.8	13.3 12.3
14	13 33.5	13 35.7	12 56.4	1.4 1.3	7.4 6.7	13.4 12.2	14	13 48.5	13 50.8	13 10.8	1.4 1.3	7.4 6.8	13.4 12.4
15	13 33.8	13 36.0	12 56.7	1.5 1.4	7.5 6.8	13.5 12.3	15	13 48.8	13 51.0	13 11.0	1.5 1.4	7.5 6.9	13.5 12.5
16	13 34.0	13 36.2	12 56.9	1.6 1.5	7.6 6.9	13.6 12.4	16	13 49.0	13 51.3	13 11.2	1.6 1.5	7.6 7.0	13.6 12.6
17	13 34.3	13 36.5	12 57.2	1.7 1.5	7.7 7.0	13.7 12.4	17	13 49.3	13 51.5	13 11.5	1.7 1.6	7.7 7.1	13.7 12.7
18	13 34.5	13 36.7	12 57.4	1.8 1.6	7.8 7.1	13.8 12.5	18	13 49.5	13 51.8	13 11.7	1.8 1.7	7.8 7.2	13.8 12.8
19	13 34.8	13 37.0	12 57.6	1.9 1.7	7.9 7.2	13.9 12.6	19	13 49.8	13 52.0	13 12.0	1.9 1.8	7.9 7.3	13.9 12.9
20	13 35.0	13 37.2	12 57.9	2.0 1.8	8.0 7.3	14.0 12.7	20	13 50.0	13 52.3	13 12.2	2.0 1.9	8.0 7.4	14.0 13.0
21	13 35.3	13 37.5	12 58.1	2.1 1.9	8.1 7.4	14.1 12.8	21	13 50.3	13 52.5	13 12.4	2.1 1.9	8.1 7.5	14.1 13.0
22	13 35.5	13 37.7	12 58.3	2.2 2.0	8.2 7.4	14.2 12.9	22	13 50.5	13 52.8	13 12.7	2.2 2.0	8.2 7.6	14.2 13.1
23	13 35.8	13 38.0	12 58.6	2.3 2.1	8.3 7.5	14.3 13.0	23	13 50.8	13 53.0	13 12.9	2.3 2.1	8.3 7.7	14.3 13.2
24	13 36.0	13 38.2	12 58.8	2.4 2.2	8.4 7.6	14.4 13.1	24	13 51.0	13 53.3	13 13.1	2.4 2.2	8.4 7.8	14.4 13.3
25	13 36.3	13 38.5	12 59.1	2.5 2.3	8.5 7.7	14.5 13.2	25	13 51.3	13 53.5	13 13.4	2.5 2.3	8.5 7.9	14.5 13.4
26	13 36.5	13 38.7	12 59.3	2.6 2.4	8.6 7.8	14.6 13.3	26	13 51.5	13 53.8	13 13.6	2.6 2.4	8.6 8.0	14.6 13.5
27	13 36.8	13 39.0	12 59.5	2.7 2.5	8.7 7.9	14.7 13.4	27	13 51.8	13 54.0	13 13.9	2.7 2.5	8.7 8.0	14.7 13.6
28	13 37.0	13 39.2	12 59.8	2.8 2.5	8.8 8.0	14.8 13.4	28	13 52.0	13 54.3	13 14.1	2.8 2.6	8.8 8.1	14.8 13.7
29	13 37.3	13 39.5	13 00.0	2.9 2.6	8.9 8.1	14.9 13.5	29	13 52.3	13 54.5	13 14.3	2.9 2.7	8.9 8.2	14.9 13.8
30	13 37.5	13 39.7	13 00.3	3.0 2.7	9.0 8.2	15.0 13.6	30	13 52.5	13 54.8	13 14.6	3.0 2.8	9.0 8.3	15.0 13.9
31	13 37.8	13 40.0	13 00.5	3.1 2.8	9.1 8.3	15.1 13.7	31	13 52.8	13 55.0	13 14.8	3.1 2.9	9.1 8.4	15.1 14.0
32	13 38.0	13 40.2	13 00.7	3.2 2.9	9.2 8.4	15.2 13.8	32	13 53.0	13 55.3	13 15.1	3.2 3.0	9.2 8.5	15.2 14.1
33	13 38.3	13 40.5	13 01.0	3.3 3.0	9.3 8.4	15.3 13.9	33	13 53.3	13 55.5	13 15.3	3.3 3.1	9.3 8.6	15.3 14.2
34	13 38.5	13 40.7	13 01.2	3.4 3.1	9.4 8.5	15.4 14.0	34	13 53.5	13 55.8	13 15.5	3.4 3.1	9.4 8.7	15.4 14.2
35	13 38.8	13 41.0	13 01.5	3.5 3.2	9.5 8.6	15.5 14.1	35	13 53.8	13 56.0	13 15.8	3.5 3.2	9.5 8.8	15.5 14.3
36	13 39.0	13 41.2	13 01.7	3.6 3.3	9.6 8.7	15.6 14.2	36	13 54.0	13 56.3	13 16.0	3.6 3.3	9.6 8.9	15.6 14.4
37	13 39.3	13 41.5	13 01.9	3.7 3.4	9.7 8.8	15.7 14.3	37	13 54.3	13 56.5	13 16.2	3.7 3.4	9.7 9.0	15.7 14.5
38	13 39.5	13 41.7	13 02.2	3.8 3.5	9.8 8.9	15.8 14.4	38	13 54.5	13 56.8	13 16.5	3.8 3.5	9.8 9.1	15.8 14.6
39	13 39.8	13 42.0	13 02.4	3.9 3.5	9.9 9.0	15.9 14.4	39	13 54.8	13 57.0	13 16.7	3.9 3.6	9.9 9.2	15.9 14.7
40	13 40.0	13 42.2	13 02.6	4.0 3.6	10.0 9.1	16.0 14.5	40	13 55.0	13 57.3	13 17.0	4.0 3.7	10.0 9.3	16.0 14.8
41	13 40.3	13 42.5	13 02.9	4.1 3.7	10.1 9.2	16.1 14.6	41	13 55.3	13 57.5	13 17.2	4.1 3.8	10.1 9.3	16.1 14.9
42	13 40.5	13 42.7	13 03.1	4.2 3.8	10.2 9.3	16.2 14.7	42	13 55.5	13 57.8	13 17.4	4.2 3.9	10.2 9.4	16.2 15.0
43	13 40.8	13 43.0	13 03.4	4.3 3.9	10.3 9.4	16.3 14.8	43	13 55.8	13 58.0	13 17.7	4.3 4.0	10.3 9.5	16.3 15.1
44	13 41.0	13 43.2	13 03.6	4.4 4.0	10.4 9.4	16.4 14.9	44	13 56.0	13 58.3	13 17.9	4.4 4.1	10.4 9.6	16.4 15.2
45	13 41.3	13 43.5	13 03.8	4.5 4.1	10.5 9.5	16.5 15.0	45	13 56.3	13 58.5	13 18.2	4.5 4.2	10.5 9.7	16.5 15.3
46	13 41.5	13 43.7	13 04.1	4.6 4.2	10.6 9.6	16.6 15.1	46	13 56.5	13 58.8	13 18.4	4.6 4.3	10.6 9.8	16.6 15.4
47	13 41.8	13 44.0	13 04.3	4.7 4.3	10.7 9.7	16.7 15.2	47	13 56.8	13 59.0	13 18.6	4.7 4.3	10.7 9.9	16.7 15.4
48	13 42.0	13 44.3	13 04.6	4.8 4.4	10.8 9.8	16.8 15.3	48	13 57.0	13 59.3	13 18.9	4.8 4.4	10.8 10.0	16.8 15.5
49	13 42.3	13 44.5	13 04.8	4.9 4.5	10.9 9.9	16.9 15.4	49	13 57.3	13 59.5	13 19.1	4.9 4.5	10.9 10.1	16.9 15.6
50	13 42.5	13 44.8	13 05.0	5.0 4.5	11.0 10.0	17.0 15.4	50	13 57.5	13 59.8	13 19.3	5.0 4.6	11.0 10.2	17.0 15.7
51	13 42.8	13 45.0	13 05.3	5.1 4.6	11.1 10.1	17.1 15.5	51	13 57.8	14 00.0	13 19.6	5.1 4.7	11.1 10.3	17.1 15.8
52	13 43.0	13 45.3	13 05.5	5.2 4.7	11.2 10.2	17.2 15.6	52	13 58.0	14 00.3	13 19.8	5.2 4.8	11.2 10.4	17.2 15.9
53	13 43.3	13 45.5	13 05.7	5.3 4.8	11.3 10.3	17.3 15.7	53	13 58.3	14 00.5	13 20.1	5.3 4.9	11.3 10.5	17.3 16.0
54	13 43.5	13 45.8	13 06.0	5.4 4.9	11.4 10.4	17.4 15.8	54	13 58.5	14 00.8	13 20.3	5.4 5.0	11.4 10.5	17.4 16.1
55	13 43.8	13 46.0	13 06.2	5.5 5.0	11.5 10.4	17.5 15.9	55	13 58.8	14 01.0	13 20.5	5.5 5.1	11.5 10.6	17.5 16.2
56	13 44.0	13 46.3	13 06.5	5.6 5.1	11.6 10.5	17.6 16.0	56	13 59.0	14 01.3	13 20.8	5.6 5.2	11.6 10.7	17.6 16.3
57	13 44.3	13 46.5	13 06.7	5.7 5.2	11.7 10.6	17.7 16.1	57	13 59.3	14 01.5	13 21.0	5.7 5.3	11.7 10.8	17.7 16.4
58	13 44.5	13 46.8	13 06.9	5.8 5.3	11.8 10.7	17.8 16.2	58	13 59.5	14 01.8	13 21.3	5.8 5.4	11.8 10.9	17.8 16.5
59	13 44.8	13 47.0	13 07.2	5.9 5.4	11.9 10.8	17.9 16.3	59	13 59.8	14 02.0	13 21.5	5.9 5.5	11.9 11.0	17.9 16.6
60	13 45.0	13 47.3	13 07.4	6.0 5.5	12.0 10.9	18.0 16.4	60	14 00.0	14 02.3	13 21.7	6.0 5.6	12.0 11.1	18.0 16.7

^m 56	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
#	° /	° /	° /	/ /	/ /	/ /
00	14 00-0	14 02-3	13 21-7	0-0 0-0	6-0 5-7	12-0 11-3
01	14 00-3	14 02-6	13 22-0	0-1 0-1	6-1 5-7	12-1 11-4
02	14 00-5	14 02-8	13 22-2	0-2 0-2	6-2 5-8	12-2 11-5
03	14 00-8	14 03-1	13 22-4	0-3 0-3	6-3 5-9	12-3 11-6
04	14 01-0	14 03-3	13 22-7	0-4 0-4	6-4 6-0	12-4 11-7
05	14 01-3	14 03-6	13 22-9	0-5 0-5	6-5 6-1	12-5 11-8
06	14 01-5	14 03-8	13 23-2	0-6 0-6	6-6 6-2	12-6 11-9
07	14 01-8	14 04-1	13 23-4	0-7 0-7	6-7 6-3	12-7 12-0
08	14 02-0	14 04-3	13 23-6	0-8 0-8	6-8 6-4	12-8 12-1
09	14 02-3	14 04-6	13 23-9	0-9 0-8	6-9 6-5	12-9 12-1
10	14 02-5	14 04-8	13 24-1	1-0 0-9	7-0 6-6	13-0 12-2
11	14 02-8	14 05-1	13 24-4	1-1 1-0	7-1 6-7	13-1 12-3
12	14 03-0	14 05-3	13 24-6	1-2 1-1	7-2 6-8	13-2 12-4
13	14 03-3	14 05-6	13 24-8	1-3 1-2	7-3 6-9	13-3 12-5
14	14 03-5	14 05-8	13 25-1	1-4 1-3	7-4 7-0	13-4 12-6
15	14 03-8	14 06-1	13 25-3	1-5 1-4	7-5 7-1	13-5 12-7
16	14 04-0	14 06-3	13 25-6	1-6 1-5	7-6 7-2	13-6 12-8
17	14 04-3	14 06-6	13 25-8	1-7 1-6	7-7 7-3	13-7 12-9
18	14 04-5	14 06-8	13 26-0	1-8 1-7	7-8 7-3	13-8 13-0
19	14 04-8	14 07-1	13 26-3	1-9 1-8	7-9 7-4	13-9 13-1
20	14 05-0	14 07-3	13 26-5	2-0 1-9	8-0 7-5	14-0 13-2
21	14 05-3	14 07-6	13 26-7	2-1 2-0	8-1 7-6	14-1 13-3
22	14 05-5	14 07-8	13 27-0	2-2 2-1	8-2 7-7	14-2 13-4
23	14 05-8	14 08-1	13 27-2	2-3 2-2	8-3 7-8	14-3 13-5
24	14 06-0	14 08-3	13 27-5	2-4 2-3	8-4 7-9	14-4 13-6
25	14 06-3	14 08-6	13 27-7	2-5 2-4	8-5 8-0	14-5 13-7
26	14 06-5	14 08-8	13 27-9	2-6 2-4	8-6 8-1	14-6 13-7
27	14 06-8	14 09-1	13 28-2	2-7 2-5	8-7 8-2	14-7 13-8
28	14 07-0	14 09-3	13 28-4	2-8 2-6	8-8 8-3	14-8 13-9
29	14 07-3	14 09-6	13 28-7	2-9 2-7	8-9 8-4	14-9 14-0
30	14 07-5	14 09-8	13 28-9	3-0 2-8	9-0 8-5	15-0 14-1
31	14 07-8	14 10-1	13 29-1	3-1 2-9	9-1 8-6	15-1 14-2
32	14 08-0	14 10-3	13 29-4	3-2 3-0	9-2 8-7	15-2 14-3
33	14 08-3	14 10-6	13 29-6	3-3 3-1	9-3 8-8	15-3 14-4
34	14 08-5	14 10-8	13 29-8	3-4 3-2	9-4 8-9	15-4 14-5
35	14 08-8	14 11-1	13 30-1	3-5 3-3	9-5 8-9	15-5 14-6
36	14 09-0	14 11-3	13 30-3	3-6 3-4	9-6 9-0	15-6 14-7
37	14 09-3	14 11-6	13 30-6	3-7 3-5	9-7 9-1	15-7 14-8
38	14 09-5	14 11-8	13 30-8	3-8 3-6	9-8 9-2	15-8 14-9
39	14 09-8	14 12-1	13 31-0	3-9 3-7	9-9 9-3	15-9 15-0
40	14 10-0	14 12-3	13 31-3	4-0 3-8	10-0 9-4	16-0 15-1
41	14 10-3	14 12-6	13 31-5	4-1 3-9	10-1 9-5	16-1 15-2
42	14 10-5	14 12-8	13 31-8	4-2 4-0	10-2 9-6	16-2 15-3
43	14 10-8	14 13-1	13 32-0	4-3 4-0	10-3 9-7	16-3 15-3
44	14 11-0	14 13-3	13 32-2	4-4 4-1	10-4 9-8	16-4 15-4
45	14 11-3	14 13-6	13 32-5	4-5 4-2	10-5 9-9	16-5 15-5
46	14 11-5	14 13-8	13 32-7	4-6 4-3	10-6 10-0	16-6 15-6
47	14 11-8	14 14-1	13 32-9	4-7 4-4	10-7 10-1	16-7 15-7
48	14 12-0	14 14-3	13 33-2	4-8 4-5	10-8 10-2	16-8 15-8
49	14 12-3	14 14-6	13 33-4	4-9 4-6	10-9 10-3	16-9 15-9
50	14 12-5	14 14-8	13 33-7	5-0 4-7	11-0 10-4	17-0 16-0
51	14 12-8	14 15-1	13 33-9	5-1 4-8	11-1 10-5	17-1 16-1
52	14 13-0	14 15-3	13 34-1	5-2 4-9	11-2 10-5	17-2 16-2
53	14 13-3	14 15-6	13 34-4	5-3 5-0	11-3 10-6	17-3 16-3
54	14 13-5	14 15-8	13 34-6	5-4 5-1	11-4 10-7	17-4 16-4
55	14 13-8	14 16-1	13 34-9	5-5 5-2	11-5 10-8	17-5 16-5
56	14 14-0	14 16-3	13 35-1	5-6 5-3	11-6 10-9	17-6 16-6
57	14 14-3	14 16-6	13 35-3	5-7 5-4	11-7 11-0	17-7 16-7
58	14 14-5	14 16-8	13 35-6	5-8 5-5	11-8 11-1	17-8 16-8
59	14 14-8	14 17-1	13 35-8	5-9 5-6	11-9 11-2	17-9 16-9
60	14 15-0	14 17-3	13 36-1	6-0 5-7	12-0 11-3	18-0 17-0

^m 57	SUN PLANETS	ARIES	MOON	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ	$\frac{v}{d}$ or Corr ⁿ
s	° /	° /	° /	/ /	/ /	/ /
00	14 15-0	14 17-3	13 36-1	0-0 0-0	6-0 5-8	12-0 11-5
01	14 15-3	14 17-6	13 36-3	0-1 0-1	6-1 5-8	12-1 11-6
02	14 15-5	14 17-8	13 36-5	0-2 0-2	6-2 5-9	12-2 11-7
03	14 15-8	14 18-1	13 36-8	0-3 0-3	6-3 6-0	12-3 11-8
04	14 16-0	14 18-3	13 37-0	0-4 0-4	6-4 6-1	12-4 11-9
05	14 16-3	14 18-6	13 37-2	0-5 0-5	6-5 6-2	12-5 12-0
06	14 16-5	14 18-8	13 37-5	0-6 0-6	6-6 6-3	12-6 12-1
07	14 16-8	14 19-1	13 37-7	0-7 0-7	6-7 6-4	12-7 12-2
08	14 17-0	14 19-3	13 38-0	0-8 0-8	6-8 6-5	12-8 12-3
09	14 17-3	14 19-6	13 38-2	0-9 0-9	6-9 6-6	12-9 12-4
10	14 17-5	14 19-8	13 38-4	1-0 1-0	7-0 6-7	13-0 12-5
11	14 17-8	14 20-1	13 38-7	1-1 1-1	7-1 6-8	13-1 12-6
12	14 18-0	14 20-3	13 38-9	1-2 1-2	7-2 6-9	13-2 12-7
13	14 18-3	14 20-6	13 39-2	1-3 1-2	7-3 7-0	13-3 12-7
14	14 18-5	14 20-9	13 39-4	1-4 1-3	7-4 7-1	13-4 12-8
15	14 18-8	14 21-1	13 39-6	1-5 1-4	7-5 7-2	13-5 12-9
16	14 19-0	14 21-4	13 39-9	1-6 1-5	7-6 7-3	13-6 13-0
17	14 19-3	14 21-6	13 40-1	1-7 1-6	7-7 7-4	13-7 13-1
18	14 19-5	14 21-9	13 40-3	1-8 1-7	7-8 7-5	13-8 13-2
19	14 19-8	14 22-1	13 40-6	1-9 1-8	7-9 7-6	13-9 13-3
20	14 20-0	14 22-4	13 40-8	2-0 1-9	8-0 7-7	14-0 13-4
21	14 20-3	14 22-6	13 41-1	2-1 2-0	8-1 7-8	14-1 13-5
22	14 20-5	14 22-9	13 41-3	2-2 2-1	8-2 7-9	14-2 13-6
23	14 20-8	14 23-1	13 41-5	2-3 2-2	8-3 8-0	14-3 13-7
24	14 21-0	14 23-4	13 41-8	2-4 2-3	8-4 8-1	14-4 13-8
25	14 21-3	14 23-6	13 42-0	2-5 2-4	8-5 8-1	14-5 13-9
26	14 21-5	14 23-9	13 42-3	2-6 2-5	8-6 8-2	14-6 14-0
27	14 21-8	14 24-1	13 42-5	2-7 2-6	8-7 8-3	14-7 14-1
28	14 22-0	14 24-4	13 42-7	2-8 2-7	8-8 8-4	14-8 14-2
29	14 22-3	14 24-6	13 43-0	2-9 2-8	8-9 8-5	14-9 14-3
30	14 22-5	14 24-9	13 43-2	3-0 2-9	9-0 8-6	15-0 14-4
31	14 22-8	14 25-1	13 43-4	3-1 3-0	9-1 8-7	15-1 14-5
32	14 23-0	14 25-4	13 43-7	3-2 3-1	9-2 8-8	15-2 14-6
33	14 23-3	14 25-6	13 43-9	3-3 3-2	9-3 8-9	15-3 14-7
34	14 23-5	14 25-9	13 44-2	3-4 3-3	9-4 9-0	15-4 14-8
35	14 23-8	14 26-1	13 44-4	3-5 3-4	9-5 9-1	15-5 14-9
36	14 24-0	14 26-4	13 44-6	3-6 3-5	9-6 9-2	15-6 15-0
37	14 24-3	14 26-6	13 44-9	3-7 3-5	9-7 9-3	15-7 15-0
38	14 24-5	14 26-9	13 45-1	3-8 3-6	9-8 9-4	15-8 15-1
39	14 24-8	14 27-1	13 45-4	3-9 3-7	9-9 9-5	15-9 15-2
40	14 25-0	14 27-4	13 45-6	4-0 3-8	10-0 9-6	16-0 15-3
41	14 25-3	14 27-6	13 45-8	4-1 3-9	10-1 9-7	16-1 15-4
42	14 25-5	14 27-9	13 46-1	4-2 4-0	10-2 9-8	16-2 15-5
43	14 25-8	14 28-1	13 46-3	4-3 4-1	10-3 9-9	16-3 15-6
44	14 26-0	14 28-4	13 46-5	4-4 4-2	10-4 10-0	16-4 15-7
45	14 26-3	14 28-6	13 46-8	4-5 4-3	10-5 10-1	16-5 15-8
46	14 26-5	14 28-9	13 47-0	4-6 4-4	10-6 10-2	16-6 15-9
47	14 26-8	14 29-1	13 47-3	4-7 4-5	10-7 10-3	16-7 16-0
48	14 27-0	14 29-4	13 47-5	4-8 4-6	10-8 10-4	16-8 16-1
49	14 27-3	14 29-6	13 47-7	4-9 4-7	10-9 10-4	16-9 16-2
50	14 27-5	14 29-9	13 48-0	5-0 4-8	11-0 10-5	17-0 16-3
51	14 27-8	14 30-1	13 48-2	5-1 4-9	11-1 10-6	17-1 16-4
52	14 28-0	14 30-4	13 48-5	5-2 5-0	11-2 10-7	17-2 16-5
53	14 28-3	14 30-6	13 48-7	5-3 5-1	11-3 10-8	17-3 16-6
54	14 28-5	14 30-9	13 48-9	5-4 5-2	11-4 10-9	17-4 16-7
55	14 28-8	14 31-1	13 49-2	5-5 5-3	11-5 11-0	17-5 16-8
56	14 29-0	14 31-4	13 49-4	5-6 5-4	11-6 11-1	17-6 16-9
57	14 29-3	14 31-6	13 49-7	5-7 5-5	11-7 11-2	17-7 17-0
58	14 29-5	14 31-9	13 49-9	5-8 5-6	11-8 11-3	17-8 17-1
59	14 29-8	14 32-1	13 50-1	5-9 5-7	11-9 11-4	17-9 17-2
60	14 30-0	14 32-4	13 50-4	6-0 5-8	12-0 11-5	18-0 17-3

58 ^m	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	59 ^m	SUN PLANETS	ARIES	MOON	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ	$\begin{smallmatrix} v \\ \text{or} \\ d \end{smallmatrix}$ Corr ⁿ
s	o /	o /	o /	/ /	/ /	/ /	s	o /	o /	o /	/ /	/ /	/ /
00	14 30-0	14 32-4	13 50-4	0-0 0-0	6-0 5-9	12-0 11-7	00	14 45-0	14 47-4	14 04-7	0-0 0-0	6-0 6-0	12-0 11-9
01	14 30-3	14 32-6	13 50-6	0-1 0-1	6-1 5-9	12-1 11-8	01	14 45-3	14 47-7	14 04-9	0-1 0-1	6-1 6-0	12-1 12-0
02	14 30-5	14 32-9	13 50-8	0-2 0-2	6-2 6-0	12-2 11-9	02	14 45-5	14 47-9	14 05-2	0-2 0-2	6-2 6-1	12-2 12-1
03	14 30-8	14 33-1	13 51-1	0-3 0-3	6-3 6-1	12-3 12-0	03	14 45-8	14 48-2	14 05-4	0-3 0-3	6-3 6-2	12-3 12-2
04	14 31-0	14 33-4	13 51-3	0-4 0-4	6-4 6-2	12-4 12-1	04	14 46-0	14 48-4	14 05-6	0-4 0-4	6-4 6-3	12-4 12-3
05	14 31-3	14 33-6	13 51-6	0-5 0-5	6-5 6-3	12-5 12-2	05	14 46-3	14 48-7	14 05-9	0-5 0-5	6-5 6-4	12-5 12-4
06	14 31-5	14 33-9	13 51-8	0-6 0-6	6-6 6-4	12-6 12-3	06	14 46-5	14 48-9	14 06-1	0-6 0-6	6-6 6-5	12-6 12-5
07	14 31-8	14 34-1	13 52-0	0-7 0-7	6-7 6-5	12-7 12-4	07	14 46-8	14 49-2	14 06-4	0-7 0-7	6-7 6-6	12-7 12-6
08	14 32-0	14 34-4	13 52-3	0-8 0-8	6-8 6-6	12-8 12-5	08	14 47-0	14 49-4	14 06-6	0-8 0-8	6-8 6-7	12-8 12-7
09	14 32-3	14 34-6	13 52-5	0-9 0-9	6-9 6-7	12-9 12-6	09	14 47-3	14 49-7	14 06-8	0-9 0-9	6-9 6-8	12-9 12-8
10	14 32-5	14 34-9	13 52-8	1-0 1-0	7-0 6-8	13-0 12-7	10	14 47-5	14 49-9	14 07-1	1-0 1-0	7-0 6-9	13-0 12-9
11	14 32-8	14 35-1	13 53-0	1-1 1-1	7-1 6-9	13-1 12-8	11	14 47-8	14 50-2	14 07-3	1-1 1-1	7-1 7-0	13-1 13-0
12	14 33-0	14 35-4	13 53-2	1-2 1-2	7-2 7-0	13-2 12-9	12	14 48-0	14 50-4	14 07-5	1-2 1-2	7-2 7-1	13-2 13-1
13	14 33-3	14 35-6	13 53-5	1-3 1-3	7-3 7-1	13-3 13-0	13	14 48-3	14 50-7	14 07-8	1-3 1-3	7-3 7-2	13-3 13-2
14	14 33-5	14 35-9	13 53-7	1-4 1-4	7-4 7-2	13-4 13-1	14	14 48-5	14 50-9	14 08-0	1-4 1-4	7-4 7-3	13-4 13-3
15	14 33-8	14 36-1	13 53-9	1-5 1-5	7-5 7-3	13-5 13-2	15	14 48-8	14 51-2	14 08-3	1-5 1-5	7-5 7-4	13-5 13-4
16	14 34-0	14 36-4	13 54-2	1-6 1-6	7-6 7-4	13-6 13-3	16	14 49-0	14 51-4	14 08-5	1-6 1-6	7-6 7-5	13-6 13-5
17	14 34-3	14 36-6	13 54-4	1-7 1-7	7-7 7-5	13-7 13-4	17	14 49-3	14 51-7	14 08-7	1-7 1-7	7-7 7-6	13-7 13-6
18	14 34-5	14 36-9	13 54-7	1-8 1-8	7-8 7-6	13-8 13-5	18	14 49-5	14 51-9	14 09-0	1-8 1-8	7-8 7-7	13-8 13-7
19	14 34-8	14 37-1	13 54-9	1-9 1-9	7-9 7-7	13-9 13-6	19	14 49-8	14 52-2	14 09-2	1-9 1-9	7-9 7-8	13-9 13-8
20	14 35-0	14 37-4	13 55-1	2-0 2-0	8-0 7-8	14-0 13-7	20	14 50-0	14 52-4	14 09-5	2-0 2-0	8-0 7-9	14-0 13-9
21	14 35-3	14 37-6	13 55-4	2-1 2-0	8-1 7-9	14-1 13-7	21	14 50-3	14 52-7	14 09-7	2-1 2-1	8-1 8-0	14-1 14-0
22	14 35-5	14 37-9	13 55-6	2-2 2-1	8-2 8-0	14-2 13-8	22	14 50-5	14 52-9	14 09-9	2-2 2-2	8-2 8-1	14-2 14-1
23	14 35-8	14 38-1	13 55-9	2-3 2-2	8-3 8-1	14-3 13-9	23	14 50-8	14 53-2	14 10-2	2-3 2-3	8-3 8-2	14-3 14-2
24	14 36-0	14 38-4	13 56-1	2-4 2-3	8-4 8-2	14-4 14-0	24	14 51-0	14 53-4	14 10-4	2-4 2-4	8-4 8-3	14-4 14-3
25	14 36-3	14 38-6	13 56-3	2-5 2-4	8-5 8-3	14-5 14-1	25	14 51-3	14 53-7	14 10-6	2-5 2-5	8-5 8-4	14-5 14-4
26	14 36-5	14 38-9	13 56-6	2-6 2-5	8-6 8-4	14-6 14-2	26	14 51-5	14 53-9	14 10-9	2-6 2-6	8-6 8-5	14-6 14-5
27	14 36-8	14 39-2	13 56-8	2-7 2-6	8-7 8-5	14-7 14-3	27	14 51-8	14 54-2	14 11-1	2-7 2-7	8-7 8-6	14-7 14-6
28	14 37-0	14 39-4	13 57-0	2-8 2-7	8-8 8-6	14-8 14-4	28	14 52-0	14 54-4	14 11-4	2-8 2-8	8-8 8-7	14-8 14-7
29	14 37-3	14 39-7	13 57-3	2-9 2-8	8-9 8-7	14-9 14-5	29	14 52-3	14 54-7	14 11-6	2-9 2-9	8-9 8-8	14-9 14-8
30	14 37-5	14 39-9	13 57-5	3-0 2-9	9-0 8-8	15-0 14-6	30	14 52-5	14 54-9	14 11-8	3-0 3-0	9-0 8-9	15-0 14-9
31	14 37-8	14 40-2	13 57-8	3-1 3-0	9-1 8-9	15-1 14-7	31	14 52-8	14 55-2	14 12-1	3-1 3-1	9-1 9-0	15-1 15-0
32	14 38-0	14 40-4	13 58-0	3-2 3-1	9-2 9-0	15-2 14-8	32	14 53-0	14 55-4	14 12-3	3-2 3-2	9-2 9-1	15-2 15-1
33	14 38-3	14 40-7	13 58-2	3-3 3-2	9-3 9-1	15-3 14-9	33	14 53-3	14 55-7	14 12-6	3-3 3-3	9-3 9-2	15-3 15-2
34	14 38-5	14 40-9	13 58-5	3-4 3-3	9-4 9-2	15-4 15-0	34	14 53-5	14 55-9	14 12-8	3-4 3-4	9-4 9-3	15-4 15-3
35	14 38-8	14 41-2	13 58-7	3-5 3-4	9-5 9-3	15-5 15-1	35	14 53-8	14 56-2	14 13-0	3-5 3-5	9-5 9-4	15-5 15-4
36	14 39-0	14 41-4	13 59-0	3-6 3-5	9-6 9-4	15-6 15-2	36	14 54-0	14 56-4	14 13-3	3-6 3-6	9-6 9-5	15-6 15-5
37	14 39-3	14 41-7	13 59-2	3-7 3-6	9-7 9-5	15-7 15-3	37	14 54-3	14 56-7	14 13-5	3-7 3-7	9-7 9-6	15-7 15-6
38	14 39-5	14 41-9	13 59-4	3-8 3-7	9-8 9-6	15-8 15-4	38	14 54-5	14 56-9	14 13-8	3-8 3-8	9-8 9-7	15-8 15-7
39	14 39-8	14 42-2	13 59-7	3-9 3-8	9-9 9-7	15-9 15-5	39	14 54-8	14 57-2	14 14-0	3-9 3-9	9-9 9-8	15-9 15-8
40	14 40-0	14 42-4	13 59-9	4-0 3-9	10-0 9-8	16-0 15-6	40	14 55-0	14 57-5	14 14-2	4-0 4-0	10-0 9-9	16-0 15-9
41	14 40-3	14 42-7	14 00-1	4-1 4-0	10-1 9-8	16-1 15-7	41	14 55-3	14 57-7	14 14-5	4-1 4-1	10-1 10-0	16-1 16-0
42	14 40-5	14 42-9	14 00-4	4-2 4-1	10-2 9-9	16-2 15-8	42	14 55-5	14 58-0	14 14-7	4-2 4-2	10-2 10-1	16-2 16-1
43	14 40-8	14 43-2	14 00-6	4-3 4-2	10-3 10-0	16-3 15-9	43	14 55-8	14 58-2	14 14-9	4-3 4-3	10-3 10-2	16-3 16-2
44	14 41-0	14 43-4	14 00-9	4-4 4-3	10-4 10-1	16-4 16-0	44	14 56-0	14 58-5	14 15-2	4-4 4-4	10-4 10-3	16-4 16-3
45	14 41-3	14 43-7	14 01-1	4-5 4-4	10-5 10-2	16-5 16-1	45	14 56-3	14 58-7	14 15-4	4-5 4-5	10-5 10-4	16-5 16-4
46	14 41-5	14 43-9	14 01-3	4-6 4-5	10-6 10-3	16-6 16-2	46	14 56-5	14 59-0	14 15-7	4-6 4-6	10-6 10-5	16-6 16-5
47	14 41-8	14 44-2	14 01-6	4-7 4-6	10-7 10-4	16-7 16-3	47	14 56-8	14 59-2	14 15-9	4-7 4-7	10-7 10-6	16-7 16-6
48	14 42-0	14 44-4	14 01-8	4-8 4-7	10-8 10-5	16-8 16-4	48	14 57-0	14 59-5	14 16-1	4-8 4-8	10-8 10-7	16-8 16-7
49	14 42-3	14 44-7	14 02-1	4-9 4-8	10-9 10-6	16-9 16-5	49	14 57-3	14 59-7	14 16-4	4-9 4-9	10-9 10-8	16-9 16-8
50	14 42-5	14 44-9	14 02-3	5-0 4-9	11-0 10-7	17-0 16-6	50	14 57-5	15 00-0	14 16-6	5-0 5-0	11-0 10-9	17-0 16-9
51	14 42-8	14 45-2	14 02-5	5-1 5-0	11-1 10-8	17-1 16-7	51	14 57-8	15 00-2	14 16-9	5-1 5-1	11-1 11-0	17-1 17-0
52	14 43-0	14 45-4	14 02-8	5-2 5-1	11-2 10-9	17-2 16-8	52	14 58-0	15 00-5	14 17-1	5-2 5-2	11-2 11-1	17-2 17-1
53	14 43-3	14 45-7	14 03-0	5-3 5-2	11-3 11-0	17-3 16-9	53	14 58-3	15 00-7	14 17-3	5-3 5-3	11-3 11-2	17-3 17-2
54	14 43-5	14 45-9	14 03-3	5-4 5-3	11-4 11-1	17-4 17-0	54	14 58-5	15 01-0	14 17-6	5-4 5-4	11-4 11-3	17-4 17-3
55	14 43-8	14 46-2	14 03-5	5-5 5-4	11-5 11-2	17-5 17-1	55	14 58-8	15 01-2	14 17-8	5-5 5-5	11-5 11-4	17-5 17-4
56	14 44-0	14 46-4	14 03-7	5-6 5-5	11-6 11-3	17-6 17-2	56	14 59-0	15 01-5	14 18-0	5-6 5-6	11-6 11-5	17-6 17-5
57	14 44-3	14 46-7	14 04-0	5-7 5-6	11-7 11-4	17-7 17-3	57	14 59-3	15 01-7	14 18-3	5-7 5-7	11-7 11-6	17-7 17-6
58	14 44-5	14 46-9	14 04-2	5-8 5-7	11-8 11-5	17-8 17-4	58	14 59-5	15 02-0	14 18-5	5-8 5-8	11-8 11-7	17-8 17-7
59	14 44-8	14 47-2	14 04-4	5-9 5-8	11-9 11-6	17-9 17-5	59	14 59-8	15 02-2	14 18-8	5-9 5-9	11-9 11-8	17-9 17-8
60	14 45-0	14 47-4	14 04-7	6-0 5-9	12-0 11-7	18-0 17-6	60	15 00-0	15 02-5	14 19-0	6-0 6-0	12-0 11-9	18-0 17-9

TABLES FOR INTERPOLATING SUNRISE, MOONRISE, ETC.

TABLE I—FOR LATITUDE

Tabular Interval			Difference between the times for consecutive latitudes															
10°	5°	2°	5 ^m	10 ^m	15 ^m	20 ^m	25 ^m	30 ^m	35 ^m	40 ^m	45 ^m	50 ^m	55 ^m	60 ^m	1 ^h 05 ^m	1 ^h 10 ^m	1 ^h 15 ^m	1 ^h 20 ^m
0 30	0 15	0 06	m	m	m	m	m	m	m	m	m	m	m	m	h	m	h	m
1 00	0 30	0 12	0	0	1	1	1	1	1	2	2	2	2	2	0	02	0	02
1 30	0 45	0 18	0	1	1	2	2	3	3	3	4	4	4	5	05	05	05	05
2 00	1 00	0 24	1	2	3	4	5	5	6	7	7	8	9	10	10	10	10	10
2 30	1 15	0 30	1	2	4	5	6	7	8	9	9	10	11	12	12	13	13	13
3 00	1 30	0 36	1	3	4	6	7	8	9	10	11	12	13	14	0	15	0	16
3 30	1 45	0 42	2	3	5	7	8	10	11	12	13	14	16	17	18	18	19	19
4 00	2 00	0 48	2	4	6	8	9	11	13	14	15	16	18	19	20	21	22	22
4 30	2 15	0 54	2	4	7	9	11	13	15	16	18	19	21	22	23	24	25	26
5 00	2 30	1 00	2	5	7	10	12	14	16	18	20	22	23	25	26	27	28	29
5 30	2 45	1 06	3	5	8	11	13	16	18	20	22	24	26	28	0	29	0	31
6 00	3 00	1 12	3	6	9	12	14	17	20	22	24	26	29	31	32	33	34	36
6 30	3 15	1 18	3	6	10	13	16	19	22	24	26	29	31	34	36	37	38	40
7 00	3 30	1 24	3	7	10	14	17	20	23	26	29	31	34	37	39	41	42	44
7 30	3 45	1 30	4	7	11	15	18	22	25	28	31	34	37	40	43	44	46	48
8 00	4 00	1 36	4	8	12	16	20	23	27	30	34	37	41	44	0	47	0	51
8 30	4 15	1 42	4	8	13	17	21	25	29	33	36	40	44	48	0	51	0	56
9 00	4 30	1 48	4	9	13	18	22	27	31	35	39	43	47	52	0	55	1	01
9 30	4 45	1 54	5	9	14	19	24	28	33	38	42	47	51	56	1	00	1	08
10 00	5 00	2 00	5	10	15	20	25	30	35	40	45	50	55	60	1	05	1	15

Table I is for interpolating the LMT of sunrise, twilight, moonrise, etc., for latitude. It is to be entered, in the appropriate column on the left, with the difference between true latitude and the nearest tabular latitude which is *less* than the true latitude; and with the argument at the top which is the nearest value of the difference between the times for the tabular latitude and the next higher one; the correction so obtained is applied to the time for the tabular latitude; the sign of the correction can be seen by inspection. It is to be noted that the interpolation is not linear, so that when using this table it is essential to take out the tabular phenomenon for the latitude *less* than the true latitude.

TABLE II—FOR LONGITUDE

Long. East or West	Difference between the times for given date and preceding date (for east longitude) or for given date and following date (for west longitude)													
	10 ^m	20 ^m	30 ^m	40 ^m	50 ^m	60 ^m	1 ^h +	2 ^h +	3 ^h +	4 ^h +	5 ^h +	6 ^h +	7 ^h +	8 ^h +
0	m	m	m	m	m	m	m	m	m	m	m	m	m	m
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	1	1	1	1	2	2	2	3	3	3	04	04	05
30	1	1	2	2	3	3	4	4	5	6	6	7	07	08
40	1	2	2	3	4	5	6	7	7	8	9	10	11	12
50	1	2	3	4	6	7	8	9	10	11	12	13	14	15
60	1	3	4	6	7	8	10	11	12	14	15	17	18	19
70	2	3	5	7	8	10	12	13	15	17	18	20	22	23
80	2	4	6	8	10	12	14	16	17	19	21	23	25	27
90	2	4	7	9	11	13	16	18	20	22	24	27	29	31
100	2	5	7	10	12	15	17	20	22	25	27	30	32	35
110	3	6	8	11	14	17	19	22	25	28	31	33	36	38
120	3	6	9	12	15	18	21	24	27	31	34	37	40	42
130	3	7	10	13	17	20	23	27	30	33	37	40	43	45
140	4	7	11	14	18	22	25	29	32	36	40	43	47	49
150	4	8	12	16	19	23	27	31	35	39	43	47	51	54
160	4	8	13	17	21	25	29	33	38	42	46	50	54	58
170	4	9	13	18	22	27	31	36	40	44	49	53	57	61
180	5	9	14	19	24	28	33	38	42	47	52	57	61	65
190	5	10	15	20	25	30	35	40	45	50	55	60	65	69

Table II is for interpolating the LMT of moonrise, moonset and the Moon's meridian passage for longitude. It is entered with longitude and with the difference between the times for the given date and for the preceding date (in east longitudes) or following date (in west longitudes). The correction is normally *added* for west longitudes and *subtracted* for east longitudes, but if, as occasionally happens, the times become earlier each day instead of later, the signs of the corrections must be reversed.

INDEX TO SELECTED STARS, 2023

Name	No	Mag	SHA	Dec
<i>Acamar</i>	7	3.2	315	S 40
<i>Achernar</i>	5	0.5	335	S 57
<i>Acrux</i>	30	1.3	173	S 63
<i>Adhara</i>	19	1.5	255	S 29
<i>Aldebaran</i>	10	0.9	291	N 17
<i>Alioth</i>	32	1.8	166	N 56
<i>Alkaid</i>	34	1.9	153	N 49
<i>Alnair</i>	55	1.7	28	S 47
<i>Alnilam</i>	15	1.7	276	S 1
<i>Alphard</i>	25	2.0	218	S 9
<i>Alphecca</i>	41	2.2	126	N 27
<i>Alpheratz</i>	1	2.1	358	N 29
<i>Altair</i>	51	0.8	62	N 9
<i>Ankaa</i>	2	2.4	353	S 42
<i>Antares</i>	42	1.0	112	S 26
<i>Arcturus</i>	37	0.0	146	N 19
<i>Atria</i>	43	1.9	107	S 69
<i>Avior</i>	22	1.9	234	S 60
<i>Bellatrix</i>	13	1.6	278	N 6
<i>Betelgeuse</i>	16	Var.*	271	N 7
<i>Canopus</i>	17	-0.7	264	S 53
<i>Capella</i>	12	0.1	280	N 46
<i>Deneb</i>	53	1.3	49	N 45
<i>Denebola</i>	28	2.1	182	N 14
<i>Diphda</i>	4	2.0	349	S 18
<i>Dubhe</i>	27	1.8	194	N 62
<i>Elnath</i>	14	1.7	278	N 29
<i>Eltanin</i>	47	2.2	91	N 51
<i>Enif</i>	54	2.4	34	N 10
<i>Fomalhaut</i>	56	1.2	15	S 29
<i>Gacrux</i>	31	1.6	172	S 57
<i>Gienah</i>	29	2.6	176	S 18
<i>Hadar</i>	35	0.6	149	S 60
<i>Hamal</i>	6	2.0	328	N 24
<i>Kaus Australis</i>	48	1.9	84	S 34
<i>Kochab</i>	40	2.1	137	N 74
<i>Markab</i>	57	2.5	14	N 15
<i>Menkar</i>	8	2.5	314	N 4
<i>Menkent</i>	36	2.1	148	S 36
<i>Miaplacidus</i>	24	1.7	222	S 70
<i>Mirfak</i>	9	1.8	309	N 50
<i>Nunki</i>	50	2.0	76	S 26
<i>Peacock</i>	52	1.9	53	S 57
<i>Pollux</i>	21	1.1	243	N 28
<i>Procyon</i>	20	0.4	245	N 5
<i>Rasalhague</i>	46	2.1	96	N 13
<i>Regulus</i>	26	1.4	208	N 12
<i>Rigel</i>	11	0.1	281	S 8
<i>Rigil Kentaurus</i>	38	-0.3	140	S 61
<i>Sabik</i>	44	2.4	102	S 16
<i>Schedar</i>	3	2.2	350	N 57
<i>Shaula</i>	45	1.6	96	S 37
<i>Sirius</i>	18	-1.5	258	S 17
<i>Spica</i>	33	1.0	158	S 11
<i>Suhail</i>	23	2.2	223	S 44
<i>Vega</i>	49	0.0	81	N 39
<i>Zubenelgenubi</i>	39	2.8	137	S 16

No	Name	Mag	SHA	Dec
1	<i>Alpheratz</i>	2.1	358	N 29
2	<i>Ankaa</i>	2.4	353	S 42
3	<i>Schedar</i>	2.2	350	N 57
4	<i>Diphda</i>	2.0	349	S 18
5	<i>Achernar</i>	0.5	335	S 57
6	<i>Hamal</i>	2.0	328	N 24
7	<i>Acamar</i>	3.2	315	S 40
8	<i>Menkar</i>	2.5	314	N 4
9	<i>Mirfak</i>	1.8	309	N 50
10	<i>Aldebaran</i>	0.9	291	N 17
11	<i>Rigel</i>	0.1	281	S 8
12	<i>Capella</i>	0.1	280	N 46
13	<i>Bellatrix</i>	1.6	278	N 6
14	<i>Elnath</i>	1.7	278	N 29
15	<i>Alnilam</i>	1.7	276	S 1
16	<i>Betelgeuse</i>	Var.*	271	N 7
17	<i>Canopus</i>	-0.7	264	S 53
18	<i>Sirius</i>	-1.5	258	S 17
19	<i>Adhara</i>	1.5	255	S 29
20	<i>Procyon</i>	0.4	245	N 5
21	<i>Pollux</i>	1.1	243	N 28
22	<i>Avior</i>	1.9	234	S 60
23	<i>Suhail</i>	2.2	223	S 44
24	<i>Miaplacidus</i>	1.7	222	S 70
25	<i>Alphard</i>	2.0	218	S 9
26	<i>Regulus</i>	1.4	208	N 12
27	<i>Dubhe</i>	1.8	194	N 62
28	<i>Denebola</i>	2.1	182	N 14
29	<i>Gienah</i>	2.6	176	S 18
30	<i>Acrux</i>	1.3	173	S 63
31	<i>Gacrux</i>	1.6	172	S 57
32	<i>Alioth</i>	1.8	166	N 56
33	<i>Spica</i>	1.0	158	S 11
34	<i>Alkaid</i>	1.9	153	N 49
35	<i>Hadar</i>	0.6	149	S 60
36	<i>Menkent</i>	2.1	148	S 36
37	<i>Arcturus</i>	0.0	146	N 19
38	<i>Rigil Kentaurus</i>	-0.3	140	S 61
39	<i>Zubenelgenubi</i>	2.8	137	S 16
40	<i>Kochab</i>	2.1	137	N 74
41	<i>Alphecca</i>	2.2	126	N 27
42	<i>Antares</i>	1.0	112	S 26
43	<i>Atria</i>	1.9	107	S 69
44	<i>Sabik</i>	2.4	102	S 16
45	<i>Shaula</i>	1.6	96	S 37
46	<i>Rasalhague</i>	2.1	96	N 13
47	<i>Eltanin</i>	2.2	91	N 51
48	<i>Kaus Australis</i>	1.9	84	S 34
49	<i>Vega</i>	0.0	81	N 39
50	<i>Nunki</i>	2.0	76	S 26
51	<i>Altair</i>	0.8	62	N 9
52	<i>Peacock</i>	1.9	53	S 57
53	<i>Deneb</i>	1.3	49	N 45
54	<i>Enif</i>	2.4	34	N 10
55	<i>Alnair</i>	1.7	28	S 47
56	<i>Fomalhaut</i>	1.2	15	S 29
57	<i>Markab</i>	2.5	14	N 15

* 0.1 1.2

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ALTITUDE CORRECTION TABLES 0°-35°— MOON

App. Alt.	0° 4'	5° 9'	10° 14'	15° 19'	20° 24'	25° 29'	30° 34'	App. Alt.
	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	
00	0° 34.5	5° 58.2	10° 62.1	15° 62.8	20° 62.2	25° 60.8	30° 58.9	00
10	36.5	58.5	62.2	62.8	62.2	60.8	58.8	10
20	38.3	58.7	62.2	62.8	62.1	60.7	58.8	20
30	40.0	58.9	62.3	62.8	62.1	60.7	58.7	30
40	41.5	59.1	62.3	62.8	62.0	60.6	58.6	40
50	42.9	59.3	62.4	62.7	62.0	60.6	58.5	50
00	1° 44.2	6° 59.5	11° 62.4	16° 62.7	21° 62.0	26° 60.5	31° 58.5	00
10	45.4	59.7	62.4	62.7	61.9	60.4	58.4	10
20	46.5	59.9	62.5	62.7	61.9	60.4	58.3	20
30	47.5	60.0	62.5	62.7	61.9	60.3	58.2	30
40	48.4	60.2	62.5	62.7	61.8	60.3	58.2	40
50	49.3	60.3	62.6	62.7	61.8	60.2	58.1	50
00	2° 50.1	7° 60.5	12° 62.6	17° 62.7	22° 61.7	27° 60.1	32° 58.0	00
10	50.8	60.6	62.6	62.6	61.7	60.1	57.9	10
20	51.5	60.7	62.6	62.6	61.6	60.0	57.8	20
30	52.2	60.9	62.7	62.6	61.6	59.9	57.8	30
40	52.8	61.0	62.7	62.6	61.6	59.9	57.7	40
50	53.4	61.1	62.7	62.6	61.5	59.8	57.6	50
00	3° 53.9	8° 61.2	13° 62.7	18° 62.5	23° 61.5	28° 59.7	33° 57.5	00
10	54.4	61.3	62.7	62.5	61.4	59.7	57.4	10
20	54.9	61.4	62.7	62.5	61.4	59.6	57.4	20
30	55.3	61.5	62.8	62.5	61.3	59.5	57.3	30
40	55.7	61.6	62.8	62.4	61.3	59.5	57.2	40
50	56.1	61.6	62.8	62.4	61.2	59.4	57.1	50
00	4° 56.4	9° 61.7	14° 62.8	19° 62.4	24° 61.2	29° 59.3	34° 57.0	00
10	56.8	61.8	62.8	62.4	61.1	59.3	56.9	10
20	57.1	61.9	62.8	62.3	61.1	59.2	56.9	20
30	57.4	61.9	62.8	62.3	61.0	59.1	56.8	30
40	57.7	62.0	62.8	62.3	61.0	59.1	56.7	40
50	58.0	62.1	62.8	62.2	60.9	59.0	56.6	50
HP	L U	L U	L U	L U	L U	L U	L U	HP
54.0	0.3 0.9	0.3 0.9	0.4 1.0	0.5 1.1	0.6 1.2	0.7 1.3	0.9 1.5	54.0
54.3	0.7 1.1	0.7 1.2	0.8 1.2	0.8 1.3	0.9 1.4	1.1 1.5	1.2 1.7	54.3
54.6	1.1 1.4	1.1 1.4	1.1 1.4	1.2 1.5	1.3 1.6	1.4 1.7	1.5 1.8	54.6
54.9	1.4 1.6	1.5 1.6	1.5 1.6	1.6 1.7	1.6 1.8	1.8 1.9	1.9 2.0	54.9
55.2	1.8 1.8	1.8 1.8	1.9 1.8	1.9 1.9	2.0 2.0	2.1 2.1	2.2 2.2	55.2
55.5	2.2 2.0	2.2 2.0	2.3 2.1	2.3 2.1	2.4 2.2	2.4 2.3	2.5 2.4	55.5
55.8	2.6 2.2	2.6 2.2	2.6 2.3	2.7 2.3	2.7 2.4	2.8 2.4	2.9 2.5	55.8
56.1	3.0 2.4	3.0 2.5	3.0 2.5	3.0 2.5	3.1 2.6	3.1 2.6	3.2 2.7	56.1
56.4	3.3 2.7	3.4 2.7	3.4 2.7	3.4 2.7	3.4 2.8	3.5 2.8	3.5 2.9	56.4
56.7	3.7 2.9	3.7 2.9	3.8 2.9	3.8 2.9	3.8 3.0	3.8 3.0	3.9 3.0	56.7
57.0	4.1 3.1	4.1 3.1	4.1 3.1	4.1 3.1	4.2 3.2	4.2 3.2	4.2 3.2	57.0
57.3	4.5 3.3	4.5 3.3	4.5 3.3	4.5 3.3	4.5 3.3	4.5 3.4	4.6 3.4	57.3
57.6	4.9 3.5	4.9 3.5	4.9 3.5	4.9 3.5	4.9 3.5	4.9 3.5	4.9 3.6	57.6
57.9	5.3 3.8	5.3 3.8	5.2 3.8	5.2 3.7	5.2 3.7	5.2 3.7	5.2 3.7	57.9
58.2	5.6 4.0	5.6 4.0	5.6 4.0	5.6 4.0	5.6 3.9	5.6 3.9	5.6 3.9	58.2
58.5	6.0 4.2	6.0 4.2	6.0 4.2	6.0 4.2	6.0 4.1	5.9 4.1	5.9 4.1	58.5
58.8	6.4 4.4	6.4 4.4	6.4 4.4	6.3 4.4	6.3 4.3	6.3 4.3	6.2 4.2	58.8
59.1	6.8 4.6	6.8 4.6	6.7 4.6	6.7 4.6	6.7 4.5	6.6 4.5	6.6 4.4	59.1
59.4	7.2 4.8	7.1 4.8	7.1 4.8	7.1 4.8	7.0 4.7	7.0 4.7	6.9 4.6	59.4
59.7	7.5 5.1	7.5 5.0	7.5 5.0	7.5 5.0	7.4 4.9	7.3 4.8	7.2 4.8	59.7
60.0	7.9 5.3	7.9 5.3	7.9 5.2	7.8 5.2	7.8 5.1	7.7 5.0	7.6 4.9	60.0
60.3	8.3 5.5	8.3 5.5	8.2 5.4	8.2 5.4	8.1 5.3	8.0 5.2	7.9 5.1	60.3
60.6	8.7 5.7	8.7 5.7	8.6 5.7	8.6 5.6	8.5 5.5	8.4 5.4	8.2 5.3	60.6
60.9	9.1 5.9	9.0 5.9	9.0 5.9	8.9 5.8	8.8 5.7	8.7 5.6	8.6 5.4	60.9
61.2	9.5 6.2	9.4 6.1	9.4 6.1	9.3 6.0	9.2 5.9	9.1 5.8	8.9 5.6	61.2
61.5	9.8 6.4	9.8 6.3	9.7 6.3	9.7 6.2	9.5 6.1	9.4 5.9	9.2 5.8	61.5

DIP			
Ht. of Eye	Corr ⁿ	Ht. of Eye	Corr ⁿ
m	ft.	m	ft.
2.4	-2.8	8.0	9.5
2.6	-2.8	8.6	9.9
2.8	-2.9	9.2	10.3
3.0	-3.0	9.8	10.6
3.2	-3.1	10.5	11.0
3.4	-3.2	11.2	11.4
3.6	-3.3	11.9	11.8
3.8	-3.4	12.6	12.2
4.0	-3.5	13.3	12.6
4.3	-3.6	14.1	13.0
4.5	-3.7	14.9	13.4
4.7	-3.8	15.7	13.8
5.0	-3.9	16.5	14.2
5.2	-4.0	17.4	14.7
5.5	-4.1	18.3	15.1
5.8	-4.2	19.1	15.5
6.1	-4.3	20.1	16.0
6.3	-4.4	21.0	16.5
6.6	-4.5	22.0	16.9
6.9	-4.6	22.9	17.4
7.2	-4.7	23.9	17.9
7.5	-4.8	24.9	18.4
7.9	-4.9	26.0	18.8
8.2	-5.0	27.1	19.3
8.5	-5.1	28.1	19.8
8.8	-5.2	29.2	20.4
9.2	-5.3	30.4	20.9
9.5	-5.4	31.5	21.4

MOON CORRECTION
TABLE

The correction is in two parts; the first correction is taken from the upper part of the table with argument apparent altitude, and the second from the lower part, with argument HP, in the same column as that from which the first correction was taken. Separate corrections are given in the lower part for lower (L) and upper(U) limbs. All corrections are to be **added** to apparent altitude, but 30' is to be subtracted from the altitude of the upper limb.

For corrections for pressure and temperature see page A4.

For bubble sextant observations ignore dip, take the mean of upper and lower limb corrections and subtract 15' from the altitude.

App. Alt. = Apparent altitude
= Sextant altitude corrected for index error and dip.

ALTITUDE CORRECTION TABLES 35°–90°— MOON

App. Alt.	35°–39°	40°–44°	45°–49°	50°–54°	55°–59°	60°–64°	65°–69°	70°–74°	75°–79°	80°–84°	85°–89°	App. Alt.
	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	Corr ⁿ	
00	35° 56.5	40° 53.7	45° 50.5	50° 46.9	55° 43.1	60° 38.9	65° 34.6	70° 30.0	75° 25.3	80° 20.5	85° 15.6	00
10	56.4	53.6	50.4	46.8	42.9	38.8	34.4	29.9	25.2	20.4	15.5	10
20	56.3	53.5	50.2	46.7	42.8	38.7	34.3	29.7	25.0	20.2	15.3	20
30	56.2	53.4	50.1	46.5	42.7	38.5	34.1	29.6	24.9	20.0	15.1	30
40	56.2	53.3	50.0	46.4	42.5	38.4	34.0	29.4	24.7	19.9	15.0	40
50	56.1	53.2	49.9	46.3	42.4	38.2	33.8	29.3	24.5	19.7	14.8	50
00	36° 56.0	41° 53.1	46° 49.8	51° 46.2	56° 42.3	61° 38.1	66° 33.7	71° 29.1	76° 24.4	81° 19.6	86° 14.6	00
10	55.9	53.0	49.7	46.0	42.1	37.9	33.5	29.0	24.2	19.4	14.5	10
20	55.8	52.9	49.5	45.9	42.0	37.8	33.4	28.8	24.1	19.2	14.3	20
30	55.7	52.8	49.4	45.8	41.9	37.7	33.2	28.7	23.9	19.1	14.2	30
40	55.6	52.6	49.3	45.7	41.7	37.5	33.1	28.5	23.8	18.9	14.0	40
50	55.5	52.5	49.2	45.5	41.6	37.4	32.9	28.3	23.6	18.7	13.8	50
00	37° 55.4	42° 52.4	47° 49.1	52° 45.4	57° 41.4	62° 37.2	67° 32.8	72° 28.2	77° 23.4	82° 18.6	87° 13.7	00
10	55.3	52.3	49.0	45.3	41.3	37.1	32.6	28.0	23.3	18.4	13.5	10
20	55.2	52.2	48.8	45.2	41.2	36.9	32.5	27.9	23.1	18.2	13.3	20
30	55.1	52.1	48.7	45.0	41.0	36.8	32.3	27.7	22.9	18.1	13.2	30
40	55.0	52.0	48.6	44.9	40.9	36.6	32.2	27.6	22.8	17.9	13.0	40
50	55.0	51.9	48.5	44.8	40.8	36.5	32.0	27.4	22.6	17.8	12.8	50
00	38° 54.9	43° 51.8	48° 48.4	53° 44.6	58° 40.6	63° 36.4	68° 31.9	73° 27.2	78° 22.5	83° 17.6	88° 12.7	00
10	54.8	51.7	48.3	44.5	40.5	36.2	31.7	27.1	22.3	17.4	12.5	10
20	54.7	51.6	48.1	44.4	40.3	36.1	31.6	26.9	22.1	17.3	12.3	20
30	54.6	51.5	48.0	44.2	40.2	35.9	31.4	26.8	22.0	17.1	12.2	30
40	54.5	51.4	47.9	44.1	40.1	35.8	31.3	26.6	21.8	16.9	12.0	40
50	54.4	51.2	47.8	44.0	39.9	35.6	31.1	26.5	21.7	16.8	11.8	50
00	39° 54.3	44° 51.1	49° 47.7	54° 43.9	59° 39.8	64° 35.5	69° 31.0	74° 26.3	79° 21.5	84° 16.6	89° 11.7	00
10	54.2	51.0	47.5	43.7	39.6	35.3	30.8	26.1	21.3	16.4	11.5	10
20	54.1	50.9	47.4	43.6	39.5	35.2	30.7	26.0	21.2	16.3	11.4	20
30	54.0	50.8	47.3	43.5	39.4	35.0	30.5	25.8	21.0	16.1	11.2	30
40	53.9	50.7	47.2	43.3	39.2	34.9	30.4	25.7	20.9	16.0	11.0	40
50	53.8	50.6	47.0	43.2	39.1	34.7	30.2	25.5	20.7	15.8	10.9	50
HP	L U	L U	L U	L U	L U	L U	L U	L U	L U	L U	L U	HP
54.0	1.1 1.7	1.3 1.9	1.5 2.1	1.7 2.4	2.0 2.6	2.3 2.9	2.6 3.2	2.9 3.5	3.2 3.8	3.5 4.1	3.8 4.5	54.0
54.3	1.4 1.8	1.6 2.0	1.8 2.2	2.0 2.5	2.2 2.7	2.5 3.0	2.8 3.2	3.1 3.5	3.3 3.8	3.6 4.1	3.9 4.4	54.3
54.6	1.7 2.0	1.9 2.2	2.1 2.4	2.3 2.6	2.5 2.8	2.7 3.0	3.0 3.3	3.2 3.5	3.5 3.8	3.8 4.0	4.0 4.3	54.6
54.9	2.0 2.2	2.2 2.3	2.3 2.5	2.5 2.7	2.7 2.9	2.9 3.1	3.2 3.3	3.4 3.5	3.6 3.8	3.9 4.0	4.1 4.3	54.9
55.2	2.3 2.3	2.5 2.4	2.6 2.6	2.8 2.8	3.0 2.9	3.2 3.1	3.4 3.3	3.6 3.5	3.8 3.7	4.0 4.0	4.2 4.2	55.2
55.5	2.7 2.5	2.8 2.6	2.9 2.7	3.1 2.9	3.2 3.0	3.4 3.2	3.6 3.4	3.7 3.5	3.9 3.7	4.1 3.9	4.3 4.1	55.5
55.8	3.0 2.6	3.1 2.7	3.2 2.8	3.3 3.0	3.5 3.1	3.6 3.3	3.8 3.4	3.9 3.6	4.1 3.7	4.2 3.9	4.4 4.0	55.8
56.1	3.3 2.8	3.4 2.9	3.5 3.0	3.6 3.1	3.7 3.2	3.8 3.3	4.0 3.4	4.1 3.6	4.2 3.7	4.4 3.8	4.5 4.0	56.1
56.4	3.6 2.9	3.7 3.0	3.8 3.1	3.9 3.2	3.9 3.3	4.0 3.4	4.1 3.5	4.3 3.6	4.4 3.7	4.5 3.8	4.6 3.9	56.4
56.7	3.9 3.1	4.0 3.1	4.1 3.2	4.1 3.3	4.2 3.3	4.3 3.4	4.3 3.5	4.4 3.6	4.5 3.7	4.6 3.8	4.7 3.8	56.7
57.0	4.3 3.2	4.3 3.3	4.3 3.3	4.4 3.4	4.4 3.4	4.5 3.5	4.5 3.5	4.6 3.6	4.7 3.6	4.7 3.7	4.8 3.8	57.0
57.3	4.6 3.4	4.6 3.4	4.6 3.4	4.6 3.5	4.7 3.5	4.7 3.5	4.7 3.6	4.8 3.6	4.8 3.6	4.8 3.7	4.9 3.7	57.3
57.6	4.9 3.6	4.9 3.6	4.9 3.6	4.9 3.6	4.9 3.6	4.9 3.6	4.9 3.6	4.9 3.6	5.0 3.6	5.0 3.6	5.0 3.6	57.6
57.9	5.2 3.7	5.2 3.7	5.2 3.7	5.2 3.7	5.2 3.7	5.1 3.6	5.1 3.6	5.1 3.6	5.1 3.6	5.1 3.6	5.1 3.6	57.9
58.2	5.5 3.9	5.5 3.8	5.5 3.8	5.4 3.8	5.4 3.7	5.4 3.7	5.3 3.7	5.3 3.6	5.2 3.6	5.2 3.5	5.2 3.5	58.2
58.5	5.9 4.0	5.8 4.0	5.8 3.9	5.7 3.9	5.6 3.8	5.6 3.8	5.5 3.7	5.5 3.6	5.4 3.6	5.3 3.5	5.3 3.4	58.5
58.8	6.2 4.2	6.1 4.1	6.0 4.1	6.0 4.0	5.9 3.9	5.8 3.8	5.7 3.7	5.6 3.6	5.5 3.5	5.4 3.5	5.3 3.4	58.8
59.1	6.5 4.3	6.4 4.3	6.3 4.2	6.2 4.1	6.1 4.0	6.0 3.9	5.9 3.8	5.8 3.6	5.7 3.5	5.6 3.4	5.4 3.3	59.1
59.4	6.8 4.5	6.7 4.4	6.6 4.3	6.5 4.2	6.4 4.1	6.2 3.9	6.1 3.8	6.0 3.7	5.8 3.5	5.7 3.4	5.5 3.2	59.4
59.7	7.1 4.7	7.0 4.5	6.9 4.4	6.8 4.3	6.6 4.1	6.5 4.0	6.3 3.8	6.1 3.7	6.0 3.5	5.8 3.3	5.6 3.2	59.7
60.0	7.5 4.8	7.3 4.7	7.2 4.5	7.0 4.4	6.9 4.2	6.7 4.0	6.5 3.9	6.3 3.7	6.1 3.5	5.9 3.3	5.7 3.1	60.0
60.3	7.8 5.0	7.6 4.8	7.5 4.7	7.3 4.5	7.1 4.3	6.9 4.1	6.7 3.9	6.5 3.7	6.3 3.5	6.0 3.2	5.8 3.0	60.3
60.6	8.1 5.1	7.9 5.0	7.7 4.8	7.6 4.6	7.3 4.4	7.1 4.2	6.9 3.9	6.7 3.7	6.4 3.4	6.2 3.2	5.9 2.9	60.6
60.9	8.4 5.3	8.2 5.1	8.0 4.9	7.8 4.7	7.6 4.5	7.3 4.2	7.1 4.0	6.8 3.7	6.6 3.4	6.3 3.2	6.0 2.9	60.9
61.2	8.7 5.4	8.5 5.2	8.3 5.0	8.1 4.8	7.8 4.5	7.6 4.3	7.3 4.0	7.0 3.7	6.7 3.4	6.4 3.1	6.1 2.8	61.2
61.5	9.1 5.6	8.8 5.4	8.6 5.1	8.3 4.9	8.1 4.6	7.8 4.3	7.5 4.0	7.2 3.7	6.9 3.4	6.5 3.1	6.2 2.7	61.5

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**UK Hydrographic
Office**

Admiralty Way, Taunton, Somerset
TA1 2DN, United Kingdom
Telephone +44 (0)1823 484444
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